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REPORT

ON

MEDICAL & HEALTH WORK

IN

THE SUDAN

FOR THE YEAR

1933

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ANNUAL REPORT 1933.

SUDAN MEDICAL SERVICE.

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GENERAL REMARKS.

GENERAL HEALTH OF THE SUDAN.

No outbreaks of epidemic disease of any importance occurred during the first half of the year with the exception of 36 cases of smallpox in Omdurman, and 221 of cerebrospinal meningitis in Kordofan Province. Sporadic cases of typhoid fever were reported from Omdurman in the autumn, and there was an epidemic of this disease in Dongola, where 40 cases occurred.

The rains were average and well spaced in the Northern Sudan with a resulting diminution of the incidence of malaria in this area.

HEALTH OF KHARTOUM AND OMDURMAN.

The health of these towns remained satisfactory throughout the year. A few cases of malaria contracted locally occurred in the spring and autumn due to the invasion of Khartoum by anopheles mosquitoes, but the menace was speedily and effectively dealt with. Typhoid occurred sporadically in October and November and a total of 96 cases were reported.

The system of school examination is now complete. All Government schools in Khartoum, with a total of about 4,000 children will be examined yearly.

Treatment is arranged for all who require it, under the supervision of the Medical Officer of Health.

This should result in a great improvement in the health of the educated classes of the province and of the Sudan in years to come.

HEALTH OF OFFICIALS.

The health of officials—with the exception of Egyptians—showed an improvement over that of 1932, and the health of all classes of officials was better than in 1931.

Nationality	Average Number employ-ed	Total		Average days' sickness		Died	Invalided
		Placed on sick list	No. of days sick	For all offic-ials	For those who were sick		
British	772	132	974	1.26	7.38	2	4
Sudanese	2884	596	4783	1.65	8.03	10	6
Egyptians	742	111	899	1.21	8.10	4	1
Syrians	77	10	61	.80	6.10	-	-

The comparative figures for the past three years are as follows :—

YEAR	British			Sudanese			Egyptians			Syrians		
	days sickness	died	Invalid-ed.	days sickness	died	Invalided	days sickness	died	Invalid-ed.	days sickness	died	Invalided
1931	2.46	8	5	1.70	13	7	1.30	1	11	1.10	-	-
1932	2.05	5	5	1.75	5	5	0.84	1	2	.80	1	2
1933	1.26	2	4	1.65	10	6	1.21	4	1	.80	-	-

Assuming that a British official works for nine complete months in the year, the total number of days' sickness lost in 1933 is equivalent to the loss of 3.6 officials, and compares with previous years as follows :—

1929	1930	1931	1932	1933
16.9	6.3	8.5	5.9	3.6

The following table shows the number of days lost by officials in various provinces, over a period of three years :—

PROVINCE.	BRITISH.			SUDANESE.			EGYPTIANS.		
	1931	1932	1933	1931	1932	1933	1931	1932	1933
Northern Bahr el Ghazal ...	3.3	2.5	3.0	1.4	1.5	3.0	4.8	1.5	0.55
Berber ...	1.1	0.64	1.06	0.4	0.4	0.74	0.4	0.6	0.9
Blue Nile	1.4	2.06	2.3	1.0	2.1	1.6	2.2	1.2	1.94
Darfur ...	2.9	0.82	0.9	0.1	2.2	1.26	5.8	—	—
Dongola ...	1.8	0.42	3.37	2.0	2.2	1.39	0.7	—	—
Fung ...	1.7	6.0	3.5	1.3	1.2	3.56	2.3	0.17	1.8
Halfa ...	0.7	—	0.55	1.9	0.55	1.4	1.6	1.05	0.55
Kassala ...	0.8	0.8	1.47	2.9	1.3	1.18	0.7	0.2	0.9
Kordofan ...	1.7	3.0	2.53	0.9	1.6	3.07	1.0	0.3	1.5
Mongalla ...	1.7	3.1	3.78	6.3	2.5	2.78	3.9	1.0	2.0
Port Sudan & Suakin ...	1.8	0.7	0.92	1.7	0.4	0.3	0.9	1.1	1.77
Upper Nile	3.7	3.0	1.34	1.2	1.7	3.78	1.0	1.8	3.64
White Nile	1.0	0.4	2.53	2.3	1.2	2.43	2.0	0.8	1.28

The numbers concerned are too small to enable accurate deductions to be made.

ENDEMIC DISEASES.

Ancylostomiasis.

Halfa and Dongola Provinces contain endemic foci of the disease. These are being dealt with systematically and the incidence is decreasing. The Bahr el Ghazal and Mongalla Provinces also have endemic foci of the disease which are being investigated.

Bilharziasis.

The most important problem regarding Bilharzia is the protection of the irrigated area of the Gezira from infection. A survey of inhabitants of the Gezira is carried out yearly, and the results to date are satisfactory There is no reason to suppose that the incidence of Bilharzia is increasing in this area.

Blackwater Fever.

The incidence of this disease is below the average. It corresponds with a decrease in the malaria rate throughout the Sudan.

Leprosy.

The campaign against this disease is being extended by utilising the network of dispensaries recently established in areas where leprosy is common. By this means it is expected that in a few years' time the majority of infectious lepers will have been brought under observation, treatment and partial isolation.

Sleeping Sickness.

Mongalla Province remains free from this disease, but one imported case from the Belgian Congo was reported at Yei.

In the Bahr el Ghazal, the number of cases discovered increased from 63 to 82. The usual stringent preventative measures were taken and the incidence diminished in the second half of the year. The situation is well in hand.

Seven dispensaries have been opened during the year in the sleeping sickness district of the Bahr el Ghazal, and the number will be increased as rapidly as possible. This network of dispensaries will be of the greatest value in gaining the confidence of the people, and in giving early information of outbreaks.

Tuberculosis.

The percentage rate of admissions for tuberculosis compared with total admissions was 1.30.

(2) EPIDEMIC DISEASES.

CEREBROSPINAL MENINGITIS.

166 cases with 131 deaths were reported during the year.

The incidence for the last six years is as follows :—

	Cases.	Deaths.
1928	335	274
1929	464	340
1930	865	665
1931	348	240
1932	532	384
1933	166	131

Small outbreaks occurred in Kordofan and Berber Provinces. Elsewhere only sporadic cases were reported.

Kordofan Province.

Nuba Mountains.

Two small groups of villages in close proximity were affected ; 33 cases occurred with 25 deaths. As the villages were situated on the top of a high mountain there was little contact with other villages, and no other district was infected.

El Obeid.

A small outbreak occurred in El Obeid. The first cases occurred in the prison. In all there were 37 cases with 28 deaths.

Berber Province.

There were three minor epidemics between March and September which were confined to the northern part of the Province. 35 cases were reported with 19 deaths.

DIPHTHERIA.

51 case with 4 deaths occurred. This compares with 138 in 1932, 183 in 1931 and 68 in 1930.

This disease remained mildly endemic in Khartoum and Halfa Provinces. Sporadic cases occurred elsewhere.

RELAPSING FEVER.

No cases were reported during the year for the first time since 1925.

The incidence of this disease in the Sudan during the last six years makes an interesting and instructive epidemiological study. In 1926 it invaded Darfur Province from the west, where, after a heavy expenditure of energy and money, it was controlled before it spread into Kordofan at a cost of at least £E. 40,000 and 20,000 lives. The disease became less virulent, or the natives acquired an immunity against it, and in 1930 it was reported for the first time in the Gezira where immigrants from the western Sudan were found with the spirochaetes in their blood, carrying the disease without suffering from it.

The mortality was now 8 per cent. compared with 80 per cent. in 1926 in Darfur.

The disease was never a factor of any importance in the important central provinces, but there would have been a very different tale to tell if the efforts to prevent its spread eastwards in 1926 had not been successful. A disease of high virulence attacking the non-immune and lice ridden dense population of the Gezira on the same scale as it attacked Darfur, would have been a social and economic disaster.

SMALLPOX.

This disease was epidemic in Egypt during the winter of 1932, and Omdurman became infected in January 1933.

The most rigorous measures were taken to deal with the situation, and the outbreak was checked at once with only 39 cases and 9 deaths among a population of 110,000.

Omdurman has a very mixed population. Innumerable tribes and races are represented, and a large floating population adds to the difficulty of control. It is reassuring that the situation was rapidly and effectively dealt with under such adverse conditions.

A small outbreak also occurred in the northern part of White Nile Province. The infection was traced to Omdurman. 31 cases occurred, with 7 deaths.

Isolated cases infected from Omdurman or Egypt occurred in Blue Nile, Berber, and Halfa Provinces, but no difficulty was experienced in preventing the further spread of the disease.

Southern Sudan.

An epidemic of mild smallpox raged during the first half of the year among the Dinka tribes of southern Kordofan and northern Bahr el Ghazal Provinces.

The disease ran true to type with only slight mortality, and the natives themselves preferred the disease to vaccination. Curiously enough they recognised that an immunity was conferred by it, and were not in the least perturbed at its existence, particularly as the mortality was very low and among aged and debilitated people.

A certain number of vaccinations were carried out but in view of the mild type of disease, and the inaccessibility of the district, it was considered advisable to allow the people to get a natural immunity from the disease itself.

With the completion of the dispensary system in the northern Sudan, it may be safely said that the day of the smallpox epidemic has passed.

Small outbreaks will occur from time to time, as a result of infection from outside the Sudan, but there should be no difficulty in dealing with them. In the southern Sudan a similar standard should be reached in a few years' time when the network of dispensaries is completed.

(3) ENDEMIC DISEASES.

(1) ANCYLOSTOMIASIS.

NORTHERN SUDAN.

Halfa and Dongola Provinces contain small endemic foci of this disease. These are being dealt with systematically, and the incidence is decreasing rapidly. The results of the examination of school children this year were satisfactory.

Halfa	1,437 examined ;	36 (2.4%) positive.
Dongola	689 examined	1 (0.1%) positive.

SOUTHERN SUDAN.

(a) **Bahr el Ghazal Province.** In Wau hospital 97 cases were diagnosed. In the southern part of this province there is an endemic area from Tembura to Meridi, diminishing in intensity from west to east.

(b) **Mongalla Province.** Cases are found in Yei, Loka, Juba and Kajo Kaji districts.

At Juba 62 stools were found to be positive, out of 2,122 examined. It is considered that the percentage is higher in the other districts.

(2) BILHARZIASIS.

Vesical bilharzia is endemic in the three northern riverain provinces. It also occurs in the western provinces where water holes and ponds are infected at certain seasons of the year.

Rectal bilharzia occurs in the White Nile Province south of Khartoum and a small focus of infection has been recently discovered at Zeidab in Berber Province. The principal aim of all anti-bilharzia measures is to prevent infection of the irrigated area of the Gezira. This of course involves the attempted eradication of the disease in all those districts of the Sudan which supply labour to the Gezira, and consequently covers nearly all the known foci of the disease in the Sudan.

BLUE NILE PROVINCE (Irrigated area).

There is no indication of increase in the incidence of bilharzia in this area, and there is every reason to believe that the various measures taken to prevent it have been successful to date.

It is of interest to mention the protective measures at present in force.

The Gezira is constantly exposed to infection as large numbers of labourers from infected areas enter it at various seasons. The areas chiefly concerned are West Africa, the western provinces of the Sudan, Dongola and White Nile Provinces. They are dealt with as follows : –

Quarantines have been established at Kosti and Dueim to deal with the West Africans and Western Sudanese, and no one is allowed east of the White Nile unless found free from bilharzia or unless he has undergone treatment at the above centres.

The following figures show that a large number of bilharzia carriers are kept out of the Gezira by this means :—

	No. examined	Infected.
1928	19,402	3,820
1929	16,375	2,937
1930	27,261	4,582
1931	12,205	2,072
1932	8,319	1,170
1933	6,055	1,045

DONGOLA PROVINCE.

In Dongola Province an attempt has been made to eradicate the disease as quarantine measures are impracticable. Yearly bilharzia surveys of the province are made, followed by treatment of infected persons.

Anti-mollusc measures on the river, and pumping schemes, and the establishment of dispensaries at short intervals along the river, have already materially reduced the incidence of the disease as the following figures show :—

	Number examined.	Number found.	Percentage infected.
1928	12,213	2,259	18.0
1929	17,925	2,187	12.0
1930	26,094	2,443	9.0
1931	37,405	1,765	4.6
1932	49,077	2,470	5.0
1933	58,711	1,825	3.1

WHITE NILE PROVINCE.

Rectal bilharzia is a more debilitating and serious disease than vesical bilharzia in the Sudan and it is consequently important that it should be dealt with effectively.

The irrigated area cannot be protected by quarantine measures as the infected area marches with the western boundary of the Gezira.

The local measures so successful in Dongola have also been carried out here. The provision of wells in villages adjacent to the river has been found to be a sanitary measure of great value in reducing the incidence of the disease in this province. The following statement giving percentage rates of infection among school boys gives an indication of the success of the measures adopted :—

	1926	1930	1931	1932	1933
Ed Dueim	93	25	18.3	13	9.4
Kawa	100	24	16.0	14	.0
Geteina	90	47	17.3	13.3	.5
Aba Island	54	14	9.0	2.4	6.8

ANTI-BILHARZIA MEASURES TAKEN WITHIN THE GEZIRA.

As the risk of infection of the Gezira is only reduced and not eliminated by these measures, special precautions have been taken within the area.

A yearly examination is carried out of the indigenous population, and the floating population in the area at the time of examination. All cases found are treated.

In addition similar work is being continually carried out at the 36 dispensaries distributed over the area. In this way the risk of infection of the canals is much reduced, and an indication of the efficacy of our methods is obtained annually.

Special regulations are in force to prevent the fouling of the canals, and deep pit latrines are provided for all villages which statistics show are particularly liable to infection. It is intended in time to provide every village with adequate latrine accommodation.

It was hoped that molluscs would die if canals were allowed to remain dry during the non-watering period (3 months). This has not been found correct and it is necessary to treat the canals with molluscide while water is still in them. All canals in which infected snails are found,and canals on which are situated villages in which locally contracted cases of bilharzia have been discovered, are treated with disinfectant which is allowed to stand for 48 hours. It is usually found that molluscs do not reappear until several months have elapsed after the last disinfection.

Expert snail catchers are employed continually and a careful check is kept on the mollusc population.

The result of the various measures indicated has been to keep the Gezira practically free of bilharzia to date as the following figures indicate :—

Year.	Adults.			Children.			Total.		
	No. Exmd.	No. Inftd.	%	No. Exmd.	No. Inftd.	%	No. Exmd.	No. Inftd.	%
1926	12,734	39	0.3	3,685	37	1.	16,419	76	0.46
1929	9,431	71	0.75	2,341	37	1.6	11,772	108	0.81
1930	8,783	6	0.07	3,322	20	0.57	12,105	26	0.21
1931	11,102	84	0.75	6,895	51	0.73	17,995	135	0.75
1932	9,618	51	0.53	1,707	19	1.1	11,325	70	0.61
1933	14,188	28	0.2	3,288	27	0.82	17,476	55	0.28

NUMBER OF CHILDREN LOCALLY INFECTED BY BILHARZIA.

Block.	1929	1930	1931	1932	1933	
					Block	No. of villages affected.
Abdel Galil	3	1	6	—	—	—
Abdel Rahman	2	—	—	2	—	—
Barakat	3	—	7	—	—	—
Derwish	—	1	2	4	—	—
Ghubshan	3	—	2	—	1	1
Hamad el Nil	—	—	3	—	1	1
Hosh	4	—	2	—	4	2
Medina	2	1	1	1	—	—
Meringan	—	—	—	—	7	1
Nidiana	—	—	2	—	5	3
Radma	—	—	—	3	—	—
Remitab	4	—	1	3	—	—
Saadalla	8	9	13	1	7	3
Sabi Delib	—	—	—	—	4	2
Seleimi	5	—	—	—	—	—
Tabat	—	—	1	—	—	—
Tayiba	—	—	5	—	—	—
Tebub	1	8	—	1	4	2
Wad el Atyah	2	—	1	3	3	3
Wad el Bur	—	—	1	—	—	—
Wad Hussein	—	—	2	—	—	—
Wad Naaman	—	—	—	1	—	—
Wad Sulfab	—	—	2	—	1	1

The bilharzia problem of Berber and Halfa Provinces does not concern the Gezira and is dealt with entirely from the local point of view.

BERBER PROVINCE.

In the southern part of the province the disease is practically confined to pumping schemes.

The usual preventive measures have been enforced.

Rectal bilharzia was detected for the first time in this province in the Abu Selim and Timerab districts of the Zeidab scheme. 11 cases were diagnosed. An organised survey of the district is being carried out.

In the northern district the problem is more difficult to solve. The disease is common in the Manasir country where the river forms cataracts, and at certain times of the year is a vast collection of rocky pools.

Experience in this area has shown that treatment of cases without anti-mollusc measures results in a high percentage of re-infections and it is impracticable to deal adequately with the innumerable river pools.

The disease is usually mild, probably due to the fact that infection only takes place during the period of the year when the river is very low.

The great majority of patients acquire immunity in adult life, and very few cases are seen after the age of 25.

It is obviously wrong to persuade them to submit to a method of treatment which is tedious, unpleasant and dangerous for a disease which is unlikely to do them any permanent harm, particularly as it is impossible to eliminate or reduce the risk of re-infection.

The method adopted is to provide adequate facilities for treatment at dispensaries, where the infected person can attend if he considers the discomfort of the disease is greater than that of the treatment.

HALFA PROVINCE.

Considerable progress has been made in coping with the problem. Five additional dispensaries were opened, and 3 extra Sanitary Barbers appointed which should give this province as thorough a medical organisation as Dongola Province.

Bilharzia is being dealt with on similar lines in all the centres of population *i.e.*, treatment combined with anti-mollusc measures, and a marked reduction in the incidence is expected as a result. The cataract country of the Batn el Hagar and elsewhere is very sparsely populated, and is dealt with in the same way as the Manasir district of Berber Province.

KORDOFAN AND DARFUR PROVINCES.

The disease exists in a mild form. Facilities for treatment are available for all who want it.

(3) BLACKWATER FEVER.

38 cases were reported with 12 deaths.

The figures for the last five years are as follows :—

	Cases.	Deaths.
1929	20	8
1930	20	6
1931	43	20
1932	66	23
1933	38	12

The race incidence for 1933 was as follows :—

	Cases.	Deaths.
British	1	—
Canadian	1	1
Italian	1	—
French	1	—
Syrian	3	2
Greek	5	—
Maltese	1	—
Egyptian	1	—
Abyssinian	1	1
Sudanese	23	8
	38	12

23 cases with 7 deaths occurred south of the 12th parallel, and 15 cases with 5 deaths north of it.

The percentage of cases occurring south of the 12th parallel for the last four years is as follows :—

	Per cent.
1930	45
1931	60
1932	59
1933	60

Of the 15 non-Sudanese cases 10 occurred south of the 12th parallel. Of the Sudanese one was born south of the 12th parallel. Of the 23 cases among natives of the northern Sudan 13 contracted the disease south of the 12th parallel

(4) DRACONTIASIS.

This disease is confined to the southern Sudan. The incidence shows a marked decrease in Mongalla Province, the worst endemic centre.

The disease is dealt with by treating the cases, so rendering them non-infective, by treating the water in the wells to kill the cyclops, and by construction of wells designed to prevent the infection of the water.

It may be mentioned that the discovery that Heglig berries kill the cyclops without rendering the water non-potable is likely to prove of great value in dealing with this disease.

Heglig berries (Balanitis Egyptica) abound in the endemic areas.

BAHR EL GHAZAL PROVINCE.

	Cases diagnosed.	
	1933	1932
Wau Hospital	38	58
Rumbek Hospital	20	—
Dispensaries	21	—

MONGALLA PROVINCE.

Ten cases were reported from Yei, as against eighteen in 1932. This is a steady improvement in a district in which 60 per cent. of the population were at one time infected.

It is considered that this improvement is the result of the work of efficient native dressers, both by instructing the population in preventive measures, and dressing the cases.

BLUE NILE PROVINCE.

224 cases were treated.

(5) DYSENTERY.

2,553 cases were admitted to hospital of whom 2,289 were amoebic and 264 bacillary.

A large proportion of the cases of bacillary dysentery were reported from Khartoum, Port Sudan, Kassala and Kordofan.

This may be due to the fact that laboratory facilities exist in these areas for accurate diagnosis.

It is considered that bacillary dysentery is commoner in the Sudan relative to amoebic dysentery than the above figures would indicate.

The incidence of dysentery in Khartoum Province, Wad Medani and Port Sudan shows a decrease, probably due to improved sanitation.

In Kassala Town on the other hand there has been a considerable increase, and the sanitary staff have been augmented to deal with the situation.

The following table shows the admissions to hospitals for each of these two diseases, given as percentage of total admissions for all causes for the last seven years :—

	1927	1928	1929	1930	1931	1932	1933
Amoebic Dysentry	3.29	3.40	3.02	2.68	3.28	2.51	3.25
Bacillary Dysentry ...	1.21	0.80	0.75	0.37	0.41	0.41	0.38
TOTAL	4.50	4.20	3.77	3.05	3.69	2.92	3.63

(6) HYDATID DISEASE.

This disease is restricted to the Kapoeta district of Mongalla Province, where 13 cases were admitted to hospital during the year.

One case was found near Juba.

(7) KALA-AZAR.

Kala Azar is endemic along the Abyssinian border in Kassala, Upper Nile, Fung and Mongalla provinces. Sporadic cases occur in other districts, particularly Darfur Province.

KASSALA PROVINCE.

21 cases were diagnosed in Kassala hospital and 22 in Gedaref hospital, making a total of 43 cases compared with 13 last year.

Source of infection :—

Gedaref and districts	22
Erythrea	12
Kassala and districts	7
Butana	2

A disquieting feature of the Kala-Azar returns for the year is the apparent spread of infection from the southern Gedaref district where it has always been endemic, to Kassala town district.

With the exception of one Bargawi who was born and brought up in Qala En Nahal and contracted the disease there, and one Beni Amer woman born and brought up in Gedaref who contracted the disease in Gallabat, all the Gedaref victims were immigrants to that district. Of the five cases considered to have contracted the disease in Kassala three were born and brought up in Kassala and had never left it—one was resident in Kassala for three years and one for two years.

The remaining 16 cases from the Kassala Hospital total were all immigrants who contracted the disease elsewhere.

FUNG PROVINCE.

Sixty-one cases received treatment compared with 18 last year. The increase may be due to reduced individual resistance brought about by the famine conditions prevailing throughout the province during the previous year.

Sources of infection :—

Blue Nile	51
Dinder...	3
Gedaref	1*
Kassala	1*
Gezira	1*
Um Ruaba	1*
Abyssinia	3*

*Imported cases.

UPPER NILE PROVINCE.

Seven cases were diagnosed in the endemic area east of the river reported last year.

MONGALLA PROVINCE.

The area in which the disease is endemic appears to lie between Kapoeta Khor and Arrakanna Khor.

There were 58 cases diagnosed from this area, the same number as in 1932.

DISTRIBUTION.

The following list shows the number of cases occurring in the separate endemic areas, shewn as male, female and children under 15 :—

AREA.	STATION.	ADULTS.		CHILDREN		Total.
		Male.	Female.	Male.	Female.	
Kassala	Kassala	20	—	2	—	
	Gedaref	26	1	2	—	51
Northern Fung ...	Singa	18	3	4	—	25
Southern Fung ...	Roseires	18	1	3	5	
	Kurmuk	2	—	—	—	29
Darfur	El Fasher	6	1	7	—	
	Nyala	1	—	—	—	
	Abu Matariq	1	—	—	—	16
Blue Nile	Wad Medani	1	—	—	—	
	Sennar	9	—	1	—	
	Rufaa	1	—	—	—	
	Kamlin	—	—	1	—	
	Seleimi	1	—	—	—	14
Bahr el Ghazal ...	Akot	1	—	—	—	1
Mongalla	Kapoeta	27	1	15	15	58
Upper Nile	Malakal	1	—	—	—	
	Peloich	6	—	—	—	7
White Nile	Kosti	—	1	—	—	1
TOTAL ...		139	8	35	20	202

(8) LEPROSY.

It is believed that there are about 7,500 lepers in the Sudan, distributed as follows :—

Bahr el Ghazal	5,500	Fung	25
Mongalla	900	White Nile	4
Upper Nile	100	Berber	6
Dongola	64	Blue Nile	6
Kassala	37	Port Sudan	2
Khartoum	30	Halfa	1

Darfur and Kordofan each have several hundred lepers.

The incidence of leprosy decreases rapidly from south to north, and among the northern Arabs it is a rare disease. Owing to this variation in incidence the problem has to be dealt with in various ways.

In the south large leper settlements at Li-Rangu and Source Yubu deal with the very heavily infected Zande tribe. The population of these districts is subject to frequent medical inspection for sleeping sickness, and lepers are dealt with at the same time.

In other districts of the central and southern Sudan, an effort has been made to bring the lepers under control by establishing voluntary settlements near hospitals or dispensaries. Hut isolation is insisted on where possible, and the children are kept away. This will be carried out in the remainder of the Bahr el Ghazal, Mongalla Province, Kordofan (Nuba Mountains), Upper Nile, Fung and Darfur. These camps are practically self-supporting and no extra staff is entailed as dispensaries have already been established for other reasons. In these areas the incidence of leprosy is far less than in the southern Bahr el Ghazal, and it is anticipated that the majority of the lepers and in particular the infectious cases will soon be brought under observation, treatment and partial isolation. Every effort will be made to complete this scheme as soon as possible.

In the northern Arab provinces leprosy is a rare disease, and dispensaries are numerous, so that settlements and camps are unnecessary. All lepers are listed and report to the nearest hospital or dispensary at stated intervals for examination, and treatment. Their homes are also inspected.

Treatment can easily be carried out at the nearest dispensary which is seldom more than a few miles distant from the leper's home.

A leper settlement exists at Gedaref which deals with those cases from the northern provinces who cannot be treated locally.

It is supervised by the medical staff of the Gedaref Civil Hospital, two miles distant.

The situation regarding leprosy is satisfactory.

In the Bahr el Ghazal where medical opinion considered the disease was spreading rapidly six years ago, it is now believed to be under control. As the majority of infectious lepers throughout the Sudan are or soon will be under proper control, and their families under observation there is every reason to anticipate a decrease in future years. This is being accomplished without hardship to the leper himself, and without compulsory measures of any sort.

BAHR EL GHAZAL PROVINCE.

(a) Li Rangu and Meridi Settlements.

There are now 1,368 lepers under treatment in Li Rangu and 93 at Meridi.

These are being individually re-examined at the present time. The progress or otherwise of their condition is not being included in this report as, apart from the advanced cases, there is little change in the course of one year.

The fact that advanced cutaneous cases seem not to benefit at all by treatment as portrayed in the 1932 analysis of results is also upheld at Source Yubu and Amadi, and for that reason it has been the policy to supplement treatment with special rations of simsim and lulu oil, and dripping or dried meat (more rarely).

SEGREGATION.

About 10 per cent. of the lepers in the settlement are classified as infective. These have been concentrated on to a special segregation road where some 150 huts at 30 metres interval have been erected.

(b) Tembura Settlement.

An average of 500 lepers were continually under treatment during the year.

New cases admitted ... ... 21 Deaths 20

The number of cases in the various categories at the end of the year were :—

Cutaneous.	Nervous.	Mixed.
262 (63.9%)	43 (10.5%)	105 (25.6%)

The progress during the year has been as follows :—

	Better.	Stationary.	Worse.
C.1	48 (27.0%)	128 (71.9%)	2 (1.1%)
C.2	17 (19.7%)	65 (75.5%)	4 (4.6%)
C.1 N.1	5 (12.5%)	34 (85 %)	1 (2.5%)
C.1 N.2.	3 (60 %)	2 (40 %)	—
C.2. N.1.	6 (14.2%)	27 (64.2%)	9 (21.4%)
C.2 N.2	23 (43.4%)	30 (56.6%)	—
C.3 N.1.	1 (50. %)	1 (50. %)	—

Segregated lepers at Bakango.

The average numbers during the year have been :—

Male.	Female.	Children.
53	34	16

Their classification at the end of the year was as follows :—

	Cutaneous.	Nerve.	Mixed, Cut. and Nerve.
Better	3	0	11
Stationary	5	1	46
Worse	0	2	23

(c) Wau.

A small settlement enables the highly infective lepers to be segregated. Their numbers are as follows :—

	Remaining 1.1.1933.	Adm. during 1933	Disch. during 1933	Died during 1933	Remaining
Men	15	17	3	4	25
Women	10	13	—	—	23
Male Children ...	—	—	—	—	—
Female „ .	1	—	—	—	1
TOTAL ...	26	30	3	4	49

MONGALLA PROVINCE.

	Yei.	Opari.	Kajo-Kaji	Pini Camp
In Camp—Dec. 1932	225	158	192	46
Admissions	5	4		21
Re- admissions	4	—		—
Discharged	16	2		28
Desertions	2	5		—
Deaths	7	11		2
Remaining Dec., 1933	209	149	187	37

Pini Camp was opened three years ago and has been most successful. It is of interest to note that it is now self supporting with regard to food.

The medical officer in charge of Yei Camp reports that the results of treatment have been satisfactory, as the following figures show :—

Cured and discharged	16
Greatly improved	15
Improved	134
Stationary	38
Worse	8

DARFUR PROVINCE.

Marked progress has been made in bringing the lepers of this Province under treatment and observation. Whereas in 1932, only nine lepers were treated, in 1933—144 lepers were recorded as receiving treatment.

Treatment is entirely voluntary.

The Senior Medical Inspector Darfur states that the results of treatment have been most satisfactory and that many people returned to their homes apparently cured after six or eight months' treatment. Consequently, treatment has become popular, and has impressed the people even more than the treatment of syphilis.

Treatment has been almost entirely routine, 5c.cs. of a 4 per cent. solution of Alepol being given intravenously until the veins become occluded, and there-after intramuscularly. The treatment is given for three months, followed by a similar course after a month's rest.

A village has been built for the lepers near the hospital at Zalengei, where 37 lepers are living happily, and with their own cultivations.

KASSALA PROVINCE.

Gedaref Leper Colony.

A small colony of 24 lepers deals with the cases in the northern Sudan who cannot be treated locally.

(9) MALARIA.

The rains were average and well spaced in the northern and central Sudan, so that the incidence of malaria in this area was normal, except in the north of Berber Province where a small outbreak occurred due to adverse local conditions. Otherwise there were no epidemic outbreaks.

Figures as to the incidence of the three tpyes of malaria are given below.

A very remarkable change in the predominating type of malaria is demonstrated at Malakal in the Upper Nile Province. There has been a complete change from benign tertian to malignant tertian during the last few years. The predominating variety of malaria in the province is benign tertian, and it is only in towns and Government stations where there are foreign and northern Sudanese officials employed, that malignant tertian infections are common.

Province.	January	February	March	April	May	June	July	August	September	October	November	December	Total
BENIGN TERTIAN.													
Berber	3	34	23	12	9	4	13	1	10	14	13	56	192
Blue Nile	57	60	45	13	19	20	21	31	75	179	169	109	798
Darfur	4	1	1	1	1	2	2	11	14	18	1	4	60
Dongola	7	11	8	15	13	—	4	3	—	—	5	3	69
Fung	14	11	15	18	17	19	8	9	42	31	39	14	237
Halfa	—	6	4	7	6	6	4	2	1	9	11	9	65
Kassala	12	11	34	51	67	61	56	54	74	185	61	41	707
Khartoum	9	12	16	10	19	7	18	13	19	58	37	39	257
Mongalla	11	10	4	6	29	60	109	65	67	73	41	4	479
Port Sudan	1	1	1	4	2	—	—	2	3	2	4	2	22
Upper Nile	—	2	6	—	1	3	5	3	13	30	8	7	78
White Nile	6	2	12	4	2	—	3	12	22	116	26	44	249
MALIGNANT TERTIAN.													
Berber	2	19	27	35	8	6	5	1	6	11	5	6	131
Blue Nile	102	75	84	67	51	30	31	53	167	252	149	125	1186
Darfur	3	2	—	1	—	3	6	27	77	55	12	2	188
Dongola	5	19	105	82	34	6	13	8	2	—	2	5	281
Fung	24	14	11	10	31	29	29	38	48	43	35	20	332
Halfa	—	—	—	—	—	—	—	—	—	—	1	—	1
Kassala	2	5	11	16	18	15	28	31	49	68	41	20	304
Khartoum	40	68	107	45	28	11	23	41	46	52	30	22	513
Mongalla	21	11	10	19	45	77	123	122	118	108	79	22	755
Port Sudan	5	5	7	3	4	—	—	3	2	5	11	8	53
Upper Nile	37	55	34	21	20	17	27	84	118	170	149	57	789
White Nile	3	10	15	3	—	—	2	4	8	37	5	29	116
QUARTAN.													
Berber	—	—	1	1	—	—	—	—	—	1	—	1	4
Blue Nile	7	12	14	7	12	10	2	1	3	2	4	7	81
Fung	1	—	1	—	—	—	—	—	1	—	—	—	3
Kassala	—	—	—	—	1	—	2	—	1	1	—	—	5
Khartoum	1	—	—	—	—	1	1	—	—	—	1	—	4
Mongalla	1	—	—	—	—	—	—	—	2	1	—	—	4
Port Sudan	—	—	—	—	—	—	—	—	3	2	3	—	8
Upper Nile	—	6	2	2	3	2	2	2	1	4	2	6	32

GEZIRA.

The greater part of this area has now been under perennial cultivation for eight years. During this time the most stringent anti-malarial precautions have been carried out. Four British Sanitary Inspectors and a large subordinate staff are employed on this work, under the supervision of the Senior Medical Inspector, Blue Nile Province. A network of 36 dispensaries brings treatment and medical supervision within easy reach of all inhabitants, and large hospitals at Wad Medani and Abu Usher serve this area. The anti-malarial campaign requires the complete co-operation and assistance of all British residents in the Gezira, whether officials or Syndicate Inspectors. There is no doubt that largely due to this co-operation the anti-malarial work has become more efficient year by year.

Recent surveys however indicate that the incidence of malaria is probably still higher in the scheme, than outside it.

During the dry weather, the majority of mosquitoes breed out in the residual water of the dowrans and field channels, but it is possible to keep the area comparatively free by heavy baling under constant supervision. Next year, it has been decided to substitute oiling for baling in the case of the dowrans (scour-pits where the large field channels empty into the smaller ones)in order to relieve the cultivator of an arduous task, as experiments have shown it to be equally efficacious.

During the rainy season the situation is very different. Extensive lakes form in the southern area, and pools may be distributed over the whole area. Consequently if rains are heavy and badly spaced it is impossible to avoid a heavy mosquito incidence.

In addition it is difficult to bale the field channels effectively during August owing to the accumulation of storm water. At present, compulsory baling commences on October 1st. Authority has been obtained to antedate this to September 15th. Prior to this date more extensive oiling will be carried out.

The extensive surface draining scheme carried out in the southern part of the irrigated area in 1930 has been of immense value in reducing the incidence of malaria during the rains.

As the anti-mosquito measures are now approaching their maximum efficiency, further progress in the anti-malarial campaign can only be made in other directions, such as the treatment of the human carriers and a close study of the bionomics of the mosquito vector.

Accordingly, Dr. Henderson carried out research work in the Gezira over a period of ten months with special reference to the gametocyte carrier.

Over a thousand slides were examined from both children and adults, and it was found that where gametocytes were discovered, the blood was that of a child in 75 per cent. of cases.

It was further noted that sexual forms became increasingly prevalent in October, persisted in November, December and January, and then showed a rapid decrease.

Thus, the human link in the chain of malarial infection although particularly strong in children, is so for a restricted period of the year only.

Experiments were then carried out to try and find an effective therapeutic method of attacking the parasite in its passage through the human host in order to eliminate the carrier.

It was found that an adult dose of 0.02 grammes of plasmochin simplex continued daily for a period of three months did not act in any way as a true causal prophylactic, but that a dose of 0.02 grammes twice weekly exerted a decided action in preventing the circulation of gametocytes in the blood. The latter dose could be continued indefinitely without producing injurious results.

It is intended to test these very important findings by treating the children of selected blocks in the Gezira with .02 grammes of plasmochin twice a week from October to January next.

(10) PELLAGRA.

Cases were reported from Kassala Province among the Bega tribes and in the Butana. The nomads of this province suffer from a deficiency of milk which is a staple food, and are very liable to deficiency disease.

It is difficult to assess how extensive the disease is, owing to the indefinite signs and symptoms, but careful investigations are at present being carried out.

(11) RABIES.

12 cases of human rabies were reported during the year.

75 persons received treatment against rabies, of whom two were Europeans. 12 deaths were reported, (all among natives of the Sudan) of whom 6 had received treatment.

Details of the fatal cases are as follows :—

(1) A boy died 20 days after the bite, having received 10 injections.

(2) A man died 40 days after the bite, having received 23 injections.

(3) A woman died 21 days after the bite having received a full course of injections.

(4) A child died 27 days after the bite having received a full course of injections.

(5) A boy died, untreated, 21 days after the bite.

(6) A boy died two months after the bite, having received a full course of injections.

(7) A girl died two months after the bite, having received 5 injections after which she ceased to attend.

(8) Five cases died untreated and not seen by the Medical Inspector. In one case 61 days is reported as having elapsed after the bite before the onset of symptoms, death occurring 13 days later.

Distribution.

The cases are reported from the following provinces :—

PROVINCE.	Cases.	Fatal Treated.	Fatal Untreated.
Blue Nile	2	2	—
Darfur	3	3	—
Kassala	5	2	3
Kordofan	1	—	1
Mongalla	1	—	1
TOTAL	12	7	5

This disease remains endemic in Kassala, Kordofan and Darfur Provinces.

It is impossible to control all the dogs in these Provinces.

Nomads wander over a vast area accompanied by their dogs who act as watch dogs and sheep dogs.

Wild animals, particularly jackals and hyenas, form reservoirs of the disease. All that can be done is to destroy ownerless dogs, and keep the number of hyenas and jackals as low as possible.

In view of the risk to themselves and their friends, officials in Kassala, El Obeid and Darfur have been forbidden to keep dogs. The facts that treatment is not without risk, and not always effective, justify the most stringent precautions against this disease.

(12) ACUTE RHEUMATISM.

351 cases of this disease were reported (with 2 deaths) as against 211 cases (with 9 deaths) in 1932.

The distribution of the cases was :—

Province.	Cases.	Province.	Cases.
Bahr el Ghazal	64	Kassala	32
Berber	7	Khartoum	8
Blue Nile	57	Kordofan	51
Darfur	66	Port Sudan	6
Dongola	20	Upper Nile	3
Halfa	5	White Nile	9
Fung	17	Mongalla	6

(13) SCURVY.

76 cases were reported, with 1 death ; 16 of these were due to a small outbreak at Malakal prison.

(14) SLEEPING SICKNESS.

BAHR EL GHAZAL.

The total number of cases was 82, compared with 63 in 1932.

The following list shows the number of distribution of cases since 1918 :—

Year.	Tembura.	Yambio.	Year.	Tembura.	Yambio.
1918	255	—	1926	79	—
1919	621	—	1927	49	3
1920	192	—	1928	26	2
1921	656	—	1929	18	—
1922	434	—	1930	37	1
1923	839	4	1931	61	—
1924	276	14	1932	49	14
1925	203	6	1933	70	12

Total ... ...Tembura 3,865 Yambio 56

The majority of cases occurred in the two foci of infection which provided the cases in 1932, Gungura District and Tembura. The former is a thickly populated area on the border of the Belgian Congo south of Yambio, which is intersected by numerous tsetse fly infected streams.

The measures described in the annual report for 1932 were maintained, and the incidence of the disease decreased in the second half of the year. The Medical Inspector in charge reports that the situation is well in hand.

The Tembura outbreak lingered on, despite the drastic measures taken to deal with the situation. The Medical Inspector states that this outbreak, associated with infection of local fly is gradually dying down. The people have been moved from the infected area, and the roads closed. Cases continue to occur among the surrounding people, owing to illicit visits to infected areas.

MONGALLA.

The following list shows the cases of sleeping sickness occurring in Mongalla Province since 1918 :—

Year.	Yei.	Kajo-Kaji	Nimule.	Year.	Yei.	Kajo-Kaji	Nimule.
1918 ...	32	42	2	1926 ...	—	3	—
1919 ...	15	63	8	1927 ...	1	—	18
1920 ...	32	54	2	1928 ...	1*	—	—
1921 ...	24	31	12	1929 ...	—	—	—
1922 ...	7	68	35	1930 ...	—	—	—
1923 ...	3	5	4	1931 ...	—	—	—
1924 ...	—	82	9	1932 ...	—	—	—
1925 ...	—	10	9	1933 ...	1*	—	—

Total ... ... Yei 116 Kajo-Kaji 358 Nimule 99

*Contracted in Belgian Congo.

One imported case from the Belgian Congo was reported from Yei.

GENERAL.

The southern Sudan will always be liable to small outbreaks while heavily-infected areas exist across the border. The important point is that these outbreaks should be reported at once and dealt with effectively. Two small outbreaks, due to infection from outside the Sudan have occurred during the last two years at Tembura and Yambio, and a single imported case was found this year at Yei.

At present a large and expensive medical staff is employed on sleeping sickness work. The administration of the settlements and the routine examination of the whole population means that most of the time of Medical Officers is spent in doing very arduous and exacting routine work, which is more administrative than medical.

The existence of restriction of movement, compulsory inspections, and compulsory isolation tend to make medical work unpopular—as it is the world over—when associated with any form of compulsion.

Further, in the past all medical treatment has been carried out in the central hospitals in the settlement. To remedy this, arrangements have been made to open a network of dispensaries throughout the sleeping sickness areas. These will act as medical intelligence centres and as treatment centres, and when properly organised the dispensary staff should be able to do the routine medical inspections for sleeping sickness. Seven dispensaries have already been opened in the sleeping sickness areas of the Bahr el Ghazal. Medical work has already developed considerably, and it is hoped that with the relaxation of restrictions which will be possible with a close but decentralised medical administration, the compulsory side of the picture will gradually fade away, and the confidence of the natives in medical work will be gained. The ideal aimed at is a willing population, sufficiently administered medically, to allow outbreaks of sleeping sickness to be reported and dealt with at once, and with sufficient confidence in medical work to report at once if sick. This will reduce the administrative and routine work of the medical staff considerably, and enable them to devote the greater part of their time to medical work.

(15) TUBERCULOSIS.

915 cases were admitted to hospital of whom 521 were pulmonary and 394 non pulmonary.

50 of the pulmonary cases were foreigners and 15 were Sudanese who had contracted the disease in Egypt.

The nationality of foreigners affected by pulmonary and non-pulmonary tuberculosis is as follows :—

	Pulmonary.	Non-pulmonary.
West Africans and French Sudan	15	27
Abyssinians	11	16
Egyptians	6	3
Eritreans	7	1
Yemenese	6	5
Greeks	3	2
British	1	1
Somali	—	1
Kurd	1	—
TOTAL	50	56

The following table shows admissions and percentage rate of tuberculosis to other admissions for the northern and southern Sudan :—

	1931		1932		1933	
	Pul.	non-pulm.	Pul.	non-pulm.	Pul.	non-pulm.
NORTHERN SUDAN.						
Admissions for Tuberculosis ...	320	256	380	228	419	352
Total admissions	40,286		42,007		49,104	
%TB to total Adms.	0.79	0.63	0.90	0.54	0.85	0.72
	1.42		1.44		1.57	
SOUTHERN SUDAN.						
Admission for Tuberculosis ...	70	38	41	53	102	42
Total Admissions...	19,450		17,635		21,211	
%TB to total Adms.	0.36	0.19	0.23	0.30	0.48	0.20
	0.55		0.53		0.68	

The following table shows the admissions for pulmonary and non-pulmonary tuberculosis since 1922 and the percentage rate of tuberculosis cases to other admissions :—

YEAR.	Pulmonary.		Non-Pulmonary.		Total.	
	Admissions.	Percentage.	Admissions.	Percentage.	Admissions.	Percentage.
1922 ...	140	.82	94	.56	234	1.38
1923 ...	123	.72	128	.74	251	1.46
1924 ...	159	.80	131	.66	290	1.46
1925 ...	135	.62	157	.84	292	1.46
1926 ...	175	.80	196	.91	371	1.71
1927 ...	226	.86	178	.69	404	1.55
1928 ...	260	.82	237	.75	497	1.57
1929 ...	302	.65	322	.70	624	1.35
1930 ...	480	.95	300	.61	780	1.56
1931 ...	390	.65	294	.49	684	1.14
1932 ...	421	.70	281	.47	702	1.17
1933 ...	521	.74	394	.56	915	1.30

Table showing occupation of persons affected in northern Sudan compared with 1932 :—

OCCUPATION.	Cultivators	Nomads	Soldiers & Police	Day Labourers	Townsmen	women not employed unclassified	Unknown or of no occupation	Total
1932	87	8	12	66	94	41	72	380
1933	116	22	17	46	105	60	53	419

Table showing percentage rates in provinces compared with 1932 :—

Province.	Bahr-el-Ghazal	Berber	Blue Nile	Darfur	Dongola	Fung	Halfa	Kassala	Khartoum	Kordofan	Mongalla	Port Sudan	Upper Nile	White Nile
1932	.23	.83	.93	.39	1.5	1.15	2.7	.46	1.14	.65	.05	1.96	.45	. 5
1933	.72	.95	.97	.24	1.2	. 70	2.04	1. 1	1. 3	.34	.15	2. 2	.52	.52

AGE INCIDENCE.

The age group incidence of cases and deaths compared with 1932 was as follows :—

		Under 1		1–10		10–20		20–30		30–40		40–50		50–60		Over 60		Undefined.	
		C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D
Northern Sudan	1932	1	1	4	—	46	11	159	38	88	22	47	18	20	4	15	7	4	—
	1933	—	—	5	1	37	6	160	33	119	32	53	12	35	10	8	4	2	1
Southern Sudan	1932	—	—	—	—	4	1	12	2	11	1	5	1	—	—	1	—	8	1
	1933	—	—	1	—	17	1	24	1	22	2	9	1	2	1	1	—	26	8

INCIDENCE AMONG SCHOOL CHILDREN.

No cases were found during the routine examination of 18,160 school children.

SUBSEQUENT PROGRESS AFTER NOTIFICATION.

Arrangements have been made for cases admitted to the Omdurman Civil Hospital, and to the Church Missionary Society Hospital to be followed up subsequently. The table shows the cases dealt with during the last seven years :-

YEAR.	Cases notified.	Lost trace of.	Died.	Remaining.
1927	24	14	8	2
1928	22	14	7	1
1929	16	10	6	—
1930	33	9	22	2
1931	12	4	7	1
1932	24	3	12	9
1933	28	12	10	6

SPECIAL INVESTIGATIONS IN THE BAHR EL GHAZAL.

El Bimbashi Burrows has carried out a survey of the Dinka tribe in the northern Bahr el Ghazal during the last two years and has summarised his results as follows :—

Summary.

1. Tuberculosis appears to be of recent introduction amongst the Dinkas.

The results of the Intradermal Tuberculin Tests show that, up to the present, approximately, only one quarter of the total population have been tuberculized.

The disease is diffused throughout the whole District, the natives living near the Government Stations only showing a relatively small increase.

2. Dinkas are highly susceptible to tuberculosis and there is a marked liability to the more severe types amongst them. The comparative short period of survival shows that their resistance is poor.

The recent introduction and want of acquired resistance are important factors.

Undernourishment is another factor for consideration. Generally speaking the Dinkas are an improvident race and rarely cultivate sufficient for their needs.

3. The absence of tuberculosis amongst these natives in 1902, proves that the disease is on the increase.

The rate of increase cannot be determined as no records have been kept in the interim.

In the opinion of the natives, the disease is slowly increasing amongst them.

GENERAL.

There is no evidence of any increase in the incidence in the northern Sudan. This area has been in direct contact with the outside world for a long period, and its population should have acquired some immunity against the disease.

The exception to this general statement is that servants from the northern provinces who work in Egypt are very liable to infection, particularly in the damp coastal towns.

In the southern Sudan medical work has only been established for a short period, and there is not sufficient evidence for reliable deductions to be made.

The investigation carried out by Bimbashi Burrows among the Dinkas of the northern Bahr el Ghazal shows that the disease is more prevalent than was previously supposed. The disease is spread by the universal spitting, overcrowding, and lack of isolation. As with cerebrospinal meningitis housing is an important factor, and raising the standard of living is the most effective way of dealing with the problem.

The southern Sudan will require very careful supervision in the next few years to assess the reaction of a race previously isolated, to the risk of infection of tuberculosis from recent contact with the outside world.

(16) TUMOURS.

659 cases were admitted to hospital, classified as follows :—

	(Carcinoma	77)	
Malignant	(Sarcoma	42)	183
	(Unclassified	64)	
Benign	... ...	... ...	476

The following are the comparative figures for the northern and southern Sudan, shown as percentage of total admissions for the past four years :—

	1930		1931		1932		1933	
	Malig.	non Malig.	Malig.	non Malig.	Malig.	non Malig.	Malig.	non Malig.
NORTHERN SUDAN. Admissions for new growths	136	226	131	313	141	295	163	363
Total Admissions...	35,183		40,286		42,007		49,104	
%to total admissions	0.38	0.64	0.32	0.77	0.33	0.70	0.33	0.74
SOUTHERN SUDAN. Admissions for new growths	36	40	15	98	16	165	20	113
Total Admissions ...	14,746		19,450		17,635		21,211	
%to total admissions	0.24	0.27	0.07	0.50	0.09	0.93	0.09	0.53

The race incidence for malignant growths was as follows :—

Arab	136 —	74.3%
Negroid	35 —	19.1%
Others	12 —	6.6%

(17) TYPHOID FEVER.

A total of 204 cases of typhoid and paratyphoid fevers were reported, of these 181 were typhoid, 13 paratyphoid A and 10 paratyphoid B.

Cases reported since 1927 are as follows :—

	Cases.
1927	52
1928	132
1929	86
1930	73
1931	100
1932	85
1933	204

An outbreak occurred in Dongola Town during the second half of the year. A single case occurred in April, said to have been imported. Nine further cases were reported in July, and a total of 37 occurred before the end of the year when the outbreak died down.

Many sporadic cases occurred in Omdurman in October and November.

The distribution by provinces was as follows :—

Bahr el Ghazal	4
Berber	8
Blue Nile	13
Darfur	20
Dongola	37
Halfa	8
Fung	1
Kassala	3
Khartoum	96
Mongalla	1
Port Sudan	4
Upper Nile	9

(18) UNDULANT FEVER.

A total of 25 cases (with 2 deaths) was reported in 1933, as against 26 cases in 1932 and 25 in 1931.

Improved laboratory facilities have shown this disease to be endemic in Darfur Province.

The distribution for the past three years was as follows :—

PROVINCE.	1931	1932	1933
Blue Nile	10	10	6
Darfur	—	—	7
Fung	—	1	—
Kassala	11	8	10
Khartoum	2	2	1
Port Sudan	1	3	1
Upper Nile	—	1	—
White Nile	1	1	—
TOTALS	25	26	25

(19) YAWS AND SYPHILIS.

The incidence of Yaws has been reduced enormously in the southern Sudan. During the early part of the year experiments were carried out to find out whether the cheaper Bismuth preparations could be used as a substitute for Novarsenobenzol. The results were most satisfactory. As a consequence of this it was financially possible to envisage the eradication of the disease from all parts of the Sudan at an early date and an intensive campaign has been carried out in all infected districts. The results to date have been up to expectations. 13,000 injections have been given during the year in Rumbek hospital alone.

Yaws has been the cause of more disfigurement and disability in the Sudan than any other disease, and it is most encouraging both from an economic and humanitarian point of view to see its rapid elimination from this country.

Syphilis is a more difficult problem to contend with.

Opinions vary as to its incidence, but it is certainly decreasing in the northern and central Sudan.

The difficulty is to persuade natives to submit to a long course of treatment after their obvious lesions have vanished.

Further it has been found that incomplete courses of novarsenobenzol injections are useless as a line of treatment, and may definitely do harm by increasing the risk of complications later in life.

From a public health point of view it has been stated by many doctors of considerable experience in the Sudan that even an incomplete course of treatment renders the patient less infectious to others, and certainly as a result of widespread but often insufficient treatment, the incidence appears to have been considerably reduced.

Unfortunately there are no reliable statistics to prove or disprove this.

The problem has been dealt with in two ways :—

1. Novarsenobenzol is now only given when the patient agrees to submit to a full course of treatment, and he can be properly supervised. Otherwise one or more bismuth injections are given as it is believed that these deal with the obvious signs and symptoms as effectively although less dramatically than novarsenobenzol, and that insufficient treatment does no permanent harm to the individual.

Patients appreciate novarsenobenzol for its tonic effects, and simulate the symptoms and history of syphilis in order to receive an injection. This has been effectively countered by the substitution of bismuth.

2. In Darfur Province where syphilis was spreading rapidly among the Furs, arrangements were made for as many infected persons as possible to be brought to a hospital town, and undergo the full course of treatment. Most satisfactory results were obtained and it is hoped to repeat this in other districts and provinces where it is considered necessary.

With improved methods of treatment, there is no doubt that the syphilis problem is being effectively dealt with. Dramatic results comparable with those obtained in the case of Yaws, cannot be expected, but it should be remembered that the disease is mild among the Sudanese owing to their high resistance.

DARFUR PROVINCE.

As the result of an intensive campaign, 3,894 cases of active syphilis were treated in Dar Masalit and 1,531 in Zalingei district.

The percentage of infections by tribes shows that the nearer the tribe to the frontier, the greater the incidence of syphilis.

HEALTH AND SANITATION.

(a) KHARTOUM PROVINCE.

GENERAL.

The conditions of economic depression referred to in my last annual report have continued. With the exception of dysentery there has generally been a rise in the notification of the more important communicable diseases.

A small epidemic of smallpox occurred in Omdurman during the early months of the year. The spread was satisfactorily controlled. There were no cases of relapsing fever or cerebrospinal meningitis.

Of the endemic diseases there was a decline in the notifications of diphtheria and dysentery, but a considerable rise in the number of cases of enteric fever.

The number of notifications of primary malaria in the three towns showed a considerable rise over the previous year. Two peak periods occurred, in February—March and during the last three months of the year.

The experiment of sinking auger bore latrines has been discontinued as a failure. In almost every case filling was rapid. Further extension of pit latrines has been made in Omdurman. The properly constructed large pit latrine is fairly satisfactory. The question of an adequate latrine system in the Khartoum Deims will have to be considered in due course.

Progress has been made with the school medical service. A larger number of pupils were examined and adequate and continued treatment was instituted wherever necessary.

Some progress has been made in dealing with the problem of insanitary premises and overcrowding in Khartoum City. Projects for clearing some of the worst areas in the city and for providing alternative accommodation for the very poor are now receiving consideration.

A fair standard of cleanliness has been maintained in the Suk and in the public food supply generally.

STAFF.

At the beginning of the year two students from the Gordon Memorial College were appointed for training as Sanitary Officers. These men had commenced the training of Medical Officer. but were considered unsuitable for medicine and have been afforded the opportunity to follow a career in practical sanitation.

It is proposed to give these men a training course of two years, at the end of which time they will be appointed as sanitary officers on probation. It is yet too early to form an opinion on the success of this scheme. Should it prove satisfactory, I feel that the appointment of a more highly educated type of man to the Sanitary Service will be distinctly advantageous.

No further retrenchment of staff has taken place. At times the capacity of our existing staff has been strained to the utmost, but I feel it can fairly be said that the standard of efficiency has been maintained.

POPULATION.

The population of the province is estimated at 252,220. It is probable that this estimation is more accurate than that given in former years.

The following table shows the estimated population of each locality : –

	Men.	Women.	Children.	Total.
Khartoum	17,848	15,452	16,441	49,741
Khartoum North	5,244	6,238	6,967	18,449
Omdurman	27,321	36,271	46,854	110,446
Rural District	24,523	20,722	28,339	73,584
TOTAL	74,936	78,683	98,601	252,220

Of the above, the following are non-natives of the Sudan :—

	Khartoum	Khartoum North.	Omdurman	Rural Dist.	Total.
Indians.					
Men	14	6	23	2	45
Women ...	5	6	8	—	19
Children ...	28	10	15	—	53
Egyptians.					
Men	434	92	329	150	1,005
Women ...	362	104	240	21	727
Children ...	782	247	520	23	1,572
Europeans and Americans.					
Men	885	27	37	252	1,201
Women ...	525	15	32	27	599
Children ...	549	8	22	10	589
Other Non-Natives.					
Men	763	83	222	35	1,105
Women ...	498	37	128	2	665
Children ...	453	81	89	3	606
TOTAL ...	5,278	716	1,665	525	8,184

BIRTHS AND DEATHS.

5,187 births and 2,871 deaths were registered during the year, an excess of births over deaths of 2,316.

Births showed an increase of 181 and deaths an increase of 350 as compared with 1932.

	Births.		Total.	Still Births.	
	M.	F.		M.	F.
Khartoum	514	432	946	9	11
Khartoum North	282	280	562	29	23
Omdurman	814	832	1,646	11	4
Rural District	1,074	959	2,033	32	17
TOTAL	2,684	2,503	5,187	81	55

BIRTHS RECORDED BY NATIONALITIES, LOCALITIES AND SEXES.

Nationality	Khartoum		Khartoum North		Omdurman		Rural District		Total		Still Births	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
British	3	2							3	2		
Greek	13	9	1			1			14	10		
Other Europeans	4	6			1				5	6		
Egyptians & Syrians	44	37	20	24	22	13			86	74	2	2
Sudanese	444	372	259	259	783	808	1074	959	2560	2393	77	53
All Others... ...	6	6	2	2	8	10			16	18	2	
Total ...	514	432	282	280	814	832	1074	959	2684	2503	81	55
	946		562		1,646		2,033		5,187		136	

DEATHS RECORDED BY NATIONALITIES, AGE PERIODS AND SEXES.

Khartoum, Khartoum North, Omdurman, and Rural District.

NATIONALITY.	Under 1 Year	1 to 5	5 to 10	10 to 20	20 to 40	40 to 60	over 60	Total	
								M.	F.
British	—	—	—	—	2	1	—	2	1
Greek	2	—	—	—	2	2	1	6	1
Other Europeans	1	1	—	—	—	1	1	3	1
Egyptians and Syrians	7	11	3	4	5	11	13	33	21
Sudanese	418	371	117	159	451	321	945	1,329	1,453
All Others	3	4	1	1	1	2	9	11	10
Total	431	387	121	164	461	328	959	1,384	1,487
								2,871	

The infant mortality rate for the three towns was as follows :—

	Per 1,000 live births.
Khartoum	91.0
Khartoum North	97.9
Omdurman	110.6

COMMUNICABLE DISEASES.

Apart from dysentery, there was generally an increase in the notification of the more important communicable diseases.

The increase in the number of primary malaria from the three towns is disquieting and steps are being taken to increase our anti-malarial activities.

A small epidemic of smallpox in Omdurman and a considerably raised incidence of enteric fever were noteworthy during the year.

The more important communicable diseases are dealt with separately under their respective headings.

The cases which were notified during the year are summarized in the following tables.

TABLE I.

SHOWING NUMBER OF CASES NOTIFIED.

Disease	Khartoum Local Cases	Khartoum North Local Cases	Omdurman Local Cases	Total of Local Cases	Rural Dist. Cases	Imported Cases	Relapsed Cases	Grand Total
Chickenpox	35	6	4	45	4	7	—	56
Diphtheria	9	1	8	18	1	1	—	20
Bilharzia	1	2	17	20	21	43	—	84
Amoebic Dysentery	15	12	230	257	7	30	219	513
Bacillary Dysentery	9	6	8	23	3	1	20	47
Enteric Fever ...	24	7	54	85	4	7	—	96
Smallpox	—	—	36	36	3	—	—	39
Leprosy	—	1	5	6	2	6	—	14
Malaria	87	33	71	191	3874	604	545	5214
Measles ..	56	8	4	68	—	—	—	68
Sandfly Fever ...	62	2	—	64	—	—	—	64
Whooping Cough ...	6	82	57	145	174	1	—	320
Pneumonia	11	10	4	25	1	11	—	37
Pulm. Tuberculosis...	23	7	19	49	9	45	—	103
Non-Pulmonary ,, ..	25	4	10	39	17	18	—	74

COMMUNICABLE DISEASES.

TABLE II.

SHOWING CASES NOTIFIED BY MONTH AND PLACE.

Key :—K. : Khartoum, K.N. : Khartoum North, O. : Omdurman, R.D. : Rural District, I. : Imported, R. : Relapsed.

DISEASE.	Place	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	GRAND TOTAL.
Chickenpox	K.	3	7	9	4	4	4	3					1	35	
	K.N.		2	2	1							1		6	
	O.		1		1	2								4	
	R.D.		1	2							1			4	
	I.		4		1	1							1	7	56
Diphtheria	K.	1					3	2		1	1		1	9	
	K.N.												1	1	
	O.			1	2					4			1	8	
	R.D.							1						1	
	I.				1									1	20
Bilharzia	K.							1						1	
	K.N.										1	1		2	
	O.		3	2	1			1	1		5	1	3	17	
	R.D.		5			3	1						12	21	
	I.	1	3	1	3	7	7	6	4	5	1	4	1	43	84
Amoebic Dysentery	K.		1		2		1	1	1	1	7	1		15	
	K.N.	1					2	2		1	4	2		12	
	O.	12	12	19	15	42	15	20	19	24	21	20	11	230	
	R.D.		1	2	1						2	1		7	
	I.	2	1		6	2	5	4	1	2	5	2		30	
	R.	15	17	17	21	46	25	28	14	10	15	7	4	219	513
Bacillary Dysentery	K.	3									2		4	9	
	K.N.		1	1					1	2			1	6	
	O.					1		1	2		1	1	2	8	
	R.D.			1					1		1			3	
	I.								1					1	
	R.	1	1	1	2	2	1	3	3	1	2		3	20	47
Enteric Fever...	K.		1	3		3		1	4	1	6	1	4	24	
	K.N.			1								5	1	7	
	O.	3		2		1	3	2	8	7	12	8	8	54	
	R.D.								3				1	4	
	1							1	1	1	4			7	96

COMMUNICABLE DISEASES.

TABLE II. *Contd.*

SHOWING CASES NOTIFIED BY MONTH AND PLACE.

Key :—K. : Khartoum, K.N. : Khartoum North, O. : Omdurman, R.D. : Rural District, I. : Imported, R. : Relapsed.

DISEASE.	Place	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	GRAND TOTAL.
Smallpox	O.	13	22	1										36	
	R.D.							3						3	39
Leprosy	K.N.							1						1	
	O.					2					3			5	
	R.D.					1			1					2	
	I.	1				2	1			1			1	6	14
Measles	K.	1	10	1	1	5	1					14	23	56	
	K.N.	2	5	1										8	
	O.	4												4	68
Malaria	K.	4	16	14			1	4	2	5	17	10	14	87	
	K.N.		8	9							8	6	2	33	NOTE.—No distinction is made between primary and relapsed cases in Rural District and imported cases.
	O.	1	8	26	5	4	2	5	5	5	7	2	1	71	
	R.D.	185	137	190	1022	739	950	51	262	77	64	97	100	3874	
	I.	53	47	64	30	35	20	24	34	40	88	100	69	604	5,214
	R.	28	55	59	30	37	12	76	21	92	54	36	45	545	
Pulmonary Tuberculosis ...	K.		1	1		5	3	1	2	1	4	4	1	23	
	K.N.			1		1		1	2	1	1			7	
	O.		1	2	1	2		2	5		2	3	1	19	
	R.D.	1						1		2	4		1	9	
	I.	1	10	4	1	2	2	2	8	2	6	3	4	45	103
Non-Pulmonary Tuberculosis	K.	2	2				3	3	6	2	2	3	2	25	
	K.N.		1			1	1						1	4	
	O.			1		2	4	2			1			10	
	R.D.			3		4	1		2	1		4	2	17	
	I.	4				1	2		2	5	2	2		18	74

MALARIA.

During the past year cases of malaria notified have been recorded as follows:-

1. Primary cases in the three towns.
2. Relapsed cases in the three towns.
3. Rural District cases.
4. Imported cases.

No distinction between primary and relapsed cases is possible in the Rural District. The majority of the cases from here are reported by the native staff in charge of the dispensaries, the diagnosis is made on clinical grounds only and is not confirmed by examination of the blood.

Imported cases comprise those persons, who having apparently contracted the disease outside Khartoum Province, attended at one of the province centres for diagnosis and treatment. Whether the case is considered to be primary or relapsed has no bearing upon an attempt to assess the state of the public health of this province.

The total number of cases of malaria notified during the year was 5,214, an increase of 2,157 as compared with 1932.

Of these cases 191 were primary infections in the three towns, 545 were relapsed cases in the three towns, 3,874 were from the Rural District and 604 were imported.

The past year was one of high malarial incidence. An increase of 76 primary cases from the three towns was disquieting.

The cases reported from the Rural District showed an increase of 1,991 as compared with 1932. This figure, however, is significant rather of an extension of the medical work in the Rural District than of a greatly increased malarial incidence in this area.

In the latter part of the year new dispensaries were opened at Gereif East and Sururab West and their returns, from areas previously somewhat remote from medical attention, have helped to swell the total.

In addition, the Assistant Medical Officers in charge of the dispensaries at Khileila and Geili have undertaken numerous tours of the surrounding districts. Formerly their work was largely confined to their dispensaries. Such tours have had the result of bringing medical attention to, and leading to returns from districts previously largely untouched.

The monthly incidence of primary malaria in the three towns showed two peaks. 81 cases were notified in February and March and 65 cases in the last three months of the year.

In my last Annual Report the possible causes of an increased malarial incidence were explored at some length and additional anti-malarial measures were described. These measures were maintained throughout 1933, but it is apparent that more is necessary to control malaria in Khartoum.

I am confident that the breeding out of mosquitoes is, to a very great extent, controlled within the inner circle. The inner circle extends, except to the south, for a radius of fifteen miles from Khartoum. During certain periods of the year, however, there were unusual numbers of anopheline mosquitoes on the wing in the three towns and throughout much of the Rural District. Over 90 per cent. of the adult mosquitoes caught in Khartoum were females. This would appear to indicate that these mosquitoes had travelled some distance and were not the result of local breeds-out.

The view that the anopheline mosquito does not travel more than half a mile from its breeding place does not apparently apply to conditions in Khartoum and I feel that further measures must be taken to cope with the menace of this invasion.

In my last Annual Report I stated that there appear to be two main methods of procedure : one to extend the area of our inner circle and secondly to concentrate on the elimination of the malarial carrier.

The southern boundary of Khartoum Province along the Blue Nile is only 15 kilometres from the city. The Blue Nile, with its thickly wooded and cultivated banks, offers an admirable path of invasion for adult mosquitoes. All evidence points to this path as the probable route by which adult mosquitoes gain ingress to Khartoum.

It is now proposed to take over the anti-mosquito control of the northern Blue Nile area as far south as Masid. This measure will necessitate a considerable increase in staff, transport and larvicides but I feel that the added expense will be justified by results.

New dispensaries have been opened at Gereif East, Sururab West and Tuti Island. It is hoped shortly to open similar dispensaries at Deim Abu Sayed, Halfayet El Meluk and Ailafun in the Blue Nile Province. This will complete a ring of dispensaries around the three towns. Such dispensaries should prove of great benefit to the health of the adjacent inhabitants and should also result in a greatly decreased malarial carrier rate in the people around the three towns.

Further efforts are being made to prevent the ingress of adult mosquitoes into the three towns. The Mosquito Clearance Regulations for boats are to be tightened up and the "*flitting*" of trains from the south is to be further improved.

The following tables show the incidence of primary malaria in the three towns by sexes, nationalities and age periods and also cases amongst the British Troops and types of parasites :—

Sexes.

Male ...	164
Female	27
	191

Nationalities :—

British...	89
Sudanese	95
All others	7
	191

Age Periods :—

	0–5	5–10	10–20	20–30	30–40	40–50	Over 50	Undefined.
Cases	13	17	38	85	21	5	6	6

Types of Parasites :—

Malignant Tertian	136
Benign Tertian	46
Malignant and Benign Tertian	4
Undefined	5
	191

All cases amongst British Troops :—

	M.T.	B.T.	M.T. & B.T.	Undefined.	Total.
Khartoum	36	8	—	2	46
Khartoum North	19	5	1	1	26
Imported	10	2	—	3	15
Relapsed	10	12	—	6	28
TOTAL	75	27	1	12	115

ANTI-MOSQUITO WORK.

The total cost of this part of the service within the province was £E. 2,646 *i.e.* labour £E. 1,896 and larvicides £E. 750.

The total number of infections found was 7,593 of which 1,925 were in Khartoum District, 1,188 in Omdurman, 1,059 in Khartoum North and 3,421 in the Rural District.

Of the total infections 201 were in the pupal stage, a decrease of 61 as compared with the previous year, and 795 were eggs. The majority of the pupal infections were found in the Rural District.

The total of 7,593 infections showed a decrease of 6,723 as compared with 1932. I feel that this decrease was largely due to the practice of oiling all pools as soon as they were discovered and was not indicative of a greatly less number of adult mosquitoes on the wing.

EXPERIMENTAL WORK.

Larvicides. Further tests were carried out with a mixture of " Anti-Malarial Mixture" and "Ialine." This has not proved fully efficient under field conditions and we have been forced to revert to the more expensive, but more effective mixture of "Ialine" and paraffin.

CHICKENPOX.

Fifty-six cases were notified as compared with 192 in the previous year. At no stage did the disease assume epidemic proportions. 41 cases occurred during the months February to May, while but 3 cases were notified in the latter five months of the year.

SMALLPOX.

Smallpox broke out in mild epidemic form in Omdurman during the first week of the year.

Incidence.

The early cases were amongst the staff of the Omdurman Civil Hospital The first case was noticed on 4.1.33. Thirteen cases occurred in January, twenty-two in February and one in March, a total of thirty-six cases, all from Omdurman.

In mid-July three women were found suffering from smallpox in Deim Abu Sayed, a large village immediately south of Omdurman, but no further cases occurred.

Of the first thirty-six cases seven were amongst the staff of the Omdurman Civil Hospital. Four cases occurred amongst patients or ex-patients of the hospital who were in the hospital during a part or the whole of the incubation period.

Two cases occurred amongst prisoners in the Omdurman Zabtia Prison.

The remainder of the cases were spread widely throughout the town. In only one instance was it possible to trace contact with a previous known case of smallpox, nor could any particular focus of infection be discovered.

Mortality.

Nine deaths occurred in 39 cases, including one child found dead in his house and one of the July cases. Percentage mortality 23.08.

Seven of the nine deaths occurred during the latter half of the epidemic.

Race.

All the cases were in natives of the Sudan.

Cases by Sex and Age.

Males	27
Females	12

Age Periods :	0–10	10–20	20–30	30–40	40–50
	1	5	26	4	3

Deaths by Sex and Age.

Males	6
Females	3

Age Periods :	0–10	10–20	20–30	30–40	40–50
	1	1	5	1	1

Incidence in Relation to Vaccination.

The history of vaccination was investigated in every case, with the following result :—

Never vaccinated	8
Vaccinated in infancy	19
Vaccinated, but unsuccessful	6
Vaccinated 15 years previously	1
Vaccinated 10 years previously	1
Vaccinated 5 years previously	1
Vaccinated 3 years previously	1
No history	2
Vaccinated during incubation period	17

Mortality in relation to vaccination.

Total deaths	9
Never vaccinated	2
No history	2
Vaccinated in infancy	1
Vaccinated in infancy and incubation period	2
Vaccinated in incubation period only	2

In all, seventeen cases were vaccinated during the incubation period, the earliest seven or eight days before the onset of the disease. This case was an old man, the vaccination took well, but the disease became confluent in type and ended fatally.

From the scanty figures available it does not appear that vaccination during the incubation period in any way lessened the severity of the disease.

It is interesting to note that none of the cases said to have been unsuccessfully vaccinated prior to the incubation period ended fatally.

Type of Disease.

The earlier cases were of a mild and minor form. Only two of the first twenty-six cases ended fatally. In the later cases the disease assumed a severe and major form and frequently became confluent. Seven deaths occurred in the last thirteen cases.

Owing to the difficulty in tracing contacts with a previous case of small-pox it was not possible to ascertain accurately the length of the incubation period.

Prophylactic Measures.

All cases and suspected cases were isolated. This was at first carried out in the Isolation Block of the Omdurman Civil Hospital, but later some buildings of the Northern Training Area Barracks, in the south of Omdurman, were taken over, enclosed in a barbed wire fence and from 11.2.33 utilized as an Isolation Hospital.

Direct contacts of every case were vaccinated and, if necessary, re-vaccinated. Mass vaccination was instituted on 15.1.33.

Four centres were available for vaccination in Khartoum city, three in Khartoum Deims, two in Khartoum North, nine in Omdurman and five in the Rural District. A travelling dispensary carried out vaccinations in the northern area of the Blue Nile Province.

Offices and departments, schools and workshops were visited and vaccination performed. Parties of police and vaccinators were posted at the heads of the Blue and White Nile Bridges and those crossing over were vaccinated. The crews and passengers of boats arriving at the quays and foreshore were dealt with similarly.

Later, a house-to-house inspection was organized and all who were found to be unvaccinated, or in whom vaccination had been unsuccessful, were vaccinated.

The secondary outbreak in July in Deim Abu Sayed found this village well protected by the mass vaccination instituted in the early months of the year. Nevertheless a thorough inspection was made and all who did not show very obvious scars of recent successful vaccination were vaccinated. Of an estimated population of 4,000 in this village 2,784 were vaccinated in July.

The fact that there was no spread of the disease in this village, although three cases had lain undiscovered there for more than a week, appears to offer satisfactory proof of the efficiency of the prophylactic measures instituted earlier in the year.

Vaccinations.

	Khartoum	Khartoum North.	Omdurman	Rural District.	Total.
January	22,262	6,975	29,451	—	58,688
February ...	26,941	18,600	27,318	10,570	83,429
March	942	1,451	10,059	1,147	13,599
April	1	—	3,660	—	3,661
TOTAL ...	50,146	27,026	70,488	11,717	159,377

DIPHTHERIA.

20 cases of clinical diphtheria were notified as against 37 in 1932. One of these was contracted in the Rural District and one was imported. There were three deaths. Positive contacts numbered 6 and three further cases of diphtheria carriers were discovered as a result of routine swabbing.

ENTERIC FEVER.

The incidence of enteric fever was considerably higher than in recent years. 96 cases were notified as compared with 33 in 1932, and a yearly average of 47.4 cases from 1927 to 1931. 24 cases occurred in Khartoum, 7 in Khartoum North, 54 in Omdurman, 4 in the Rural District and 7 were imported. 75 cases occurred in the latter five months of the year.

At no time was it possible to trace a definite source of the disease. The cases were widely spread and it was rare to trace contact between two established cases. There was nothing in the incidence of the cases to suggest possible incrimination of a water or milk supply. During 1933 the incidence of enteric fever in the Northern Sudan and in Egypt appeared unduly high.

In a year in which the incidence of enteric fever in Khartoum Province was unusually high, it is perhaps a satisfactory feature that the incidence of dysentery was low. I feel that this fact indicates that no deterioration of our standards of sanitation can be held responsible for the former condition.

Cases by Place of Infection.

Khartoum	24
Khartoum North	7
Omdurman	54
Rural District	4
Imported	7
TOTAL	96

Cases by Sexes.

Males	63
Females	33

Nationalities.

British	2
Sudanese	86
All others	8

Age Periods.

Age period :	0–5	5–10	10–20	20–30	30–40	40–50	Over 50.	Undefined
Cases	12	22	33	18	4	4	1	2

In this report the term enteric fever is used to indicate typhoid fever and paratyphoid. The following table shows the type of organism :—

B. typhosus	79
B. para-typhosus A	5
B. para-typhosus B	2
Undefined	10

Mortality.

Deaths	7
Mortality rate	7.37%

All the deaths occurred in cases infected with B. typhosus. Hence the mortality rate for typhoid fever was 8.86%.

DYSENTERIES.

513 cases of amoebic dysentery and 47 cases of bacillary dysentery were notified during the year. 440 cases occurred in the three towns, 49 in the Rural District and 62 were imported.

Of the cases in the three towns 51 occurred in Khartoum, 42 in Khartoum North and 356 in Omdurman. 169 of the cases which occurred in the three towns were classified as relapsed.

The figure for the three towns shewed a decrease of 102 as compared with the previous year. As noted in my last annual report cases of amoebic dysentery found at out-patients were notified from June, 1932. During 1933 such cases were notified throughout the year and in consequence the figures for 1933 showed a very marked improvement on the previous year.

Bacillary Dysentery.

Cases by Place of Infection.

	Primary.	Relapsed.	Total.
Khartoum	9	4	13
Khartoum North	6	11	17
Omdurman	8	0	8
Rural District	3	0	3
Imported	1	5	6
TOTAL	27	20	47

Cases by Sexes.

Males	37
Females	10

Nationalities.

British	14
Syrians	1
Sudanese	32

Cases by Age Periods.

Age Periods :	0–5	5–10	10–20	20–30	30–40	40–50	Over 50.	Undefined
Cases	3	3	3	20	10	5	2	1

Primary and Relapse Cases and Type of Organism.

Organism	Primary.	Relapse.	Total.
Flexner	13	12	25
Shiga	6	2	8
Schmitz	6	4	10
Undefined	2	2	4
TOTAL	27	20	47

Cases amongst the British Troops.

	Flexner.	Shiga.	Schmitz.	Total.
Khartoum	3	1	1	5
Khartoum North	—	—	—	—
Relapsed	2	1	1	4
TOTAL	5	2	2	9

Mortality—Nil.

Amoebic Dysentery.

	Primary.	Relapse.	Total.
Khartoum North	15	23	38
Khartoum North	12	13	25
Omdurman	230	117	347
Imported	30	27	57
Rural District	—	—	46
TOTAL	287	180	513

Cases by Sexes.

Male	387
Female	93
	480

Thirty-three cases from the Rural District were not classified by sex and are omitted.

Nationalities.

British...	3
Egyptians and Syrians	5
Abyssinian	1
Sudanese	471
	480

Primary Cases by age Periods.

Age Periods :	0–1	1–5	5–10	10–20	20–30	30–40	40–50
Cases	5	45	28	82	73	33	12

Age Periods :	Over 50.	Undefined.	Total.
Cases	7	2	287

Cases amongst the British Troops.

Three primary cases occurred amongst the British Troops. All were contracted outside of Khartoum Province.

TUBERCULOSIS.

The number of cases of pulmonary tuberculosis contracted in Khartoum Province showed an increase of 3 as compared with the previous year. The number of cases notified which were contracted outside the province showed an increase of 5 as compared with 1932.

Non-pulmonary tuberculosis has been notifiable only since the beginning of 1932. During the past year local cases notified showed an increase of 31 and imported cases an increase of 7 as compared with the previous year.

The incidence of tuberculosis appears to have been on the increase during recent years, not only in this province, but throughout the Sudan. Whilst the present conditions of economic stress and shortage prevail it can hardly be hoped that this incidence will be lessened.

The case incidence in the three towns was :—

	Pulmonary	Non-pulmonary.
Khartoum	.46	.50
Khartoum North	.38	.22
Omdurman	.17	.09

These figures are per 1,000 of the estimated population.

Cases by Sexes.

(1) Local Cases.

	Pulmonary	Non-pulmonary
Male	43	34
Female	15	22
TOTAL	58	56

(2) Imported Cases.

	Pulmonary	Non-pulmonary.
Male	40	15
Female	5	3
	45	18

Local Cases—Probable Place of Infection.

	Pulmonary.	Non-pulmonary.	Total.
Khartoum	23	25	48
Khartoum North	7	4	11
Omdurman	19	10	29
Rural District	9	17	26
TOTAL	58	56	114

Imported Cases—Probable Place of Infection.

	Pulmonary.	Non-pulmonary.	Total.
Blue Nile	15	6	21
White Nile	3	2	5
Kassala	3	1	4
Kordofan	2	2	4
Fung	1	2	3
Port Sudan	3	0	3
Dongola	0	3	3
Halfa	3	0	3
Berber	1	1	2
Upper Nile	1	0	1
Bahr El Ghazal	1	0	1
Egypt	3	0	3
French Sudan	1	0	1
Belgian Congo	1	0	1
Unknown	7	1	8
TOTAL	45	18	63

Cases by Nationality.

	Pulmonary.	Non-pulmonary.	Total.
British	0	1	1
Egyptians	2	0	2
Greek	1	1	2
Abyssinians	1	1	2
Yemanese	0	1	1
Sudanese	99	70	169
TOTAL	103	74	177

Cases by Age.

Age Periods :	0–5	5–10	10–20	20–30	30–40	40–50	50–60
Pulmonary ...	0	1	19	37	25	12	7
Non-pulmonary	3	3	18	27	12	3	2

Age Periods :	Over 60.	Undefined.	Total.
Pulmonary	1	1	103
Non-pulmonary	3	2	74

The disposal of cases notified during the year was as follows :—

	Khartoum		Khartoum North		Omdurman		Rural District		Imported		TOTAL	
	P.	N.P.	P.	N.P.	P.	N.P.	P.	N.P.	P.	N.P.	P.	N.P.
Died	9	6	7	2	10	4	2	1	12	—	40	13
Left Province ...	5	3	—	—	1	—	—	—	18	9	24	12
Still in Hospital ...	3	4	—	—	2	1	2	—	10	6	17	11
Still in province ...	6	10	—	1	4	5	5	15	2	2	17	33
Untraced	—	2	—	1	2	—	—	1	3	1	5	5
TOTAL	23	25	7	4	19	10	9	17	45	18	103	74

The following table shows the result of a follow-up of 449 cases of pulmonary tuberculosis notified between 1927 and 1932 :—

Year of Notification.	No. of Cases.	Died	Condition in December, 1933.			
			Left District.	Alive in District.	Untraced	Total.
1927 : Local	50	27	9	3	11	65
Imported ...	15	3	8	—	4	
1928 : Local	41	27	4	1	9	66
Imported ...	25	6	10	—	9	
1929 : Local	44	17	16	3	8	74
Imported ...	30	11	15	—	4	
1930 : Local	43	26	11	4	2	82
Imported ...	39	18	18	—	3	
1931 : Local	30	20	4	2	4	67
Imported	37	15	18	—	4	
1932 : Local	55	33	11	7	4	95
Imported	40	19	16	1	4	

LEPROSY.

Fourteen cases of leprosy were notified in this province as compared with 20 in 1932. 6 of these were imported and the apparently locally contracted cases showed a decrease of two.

Age.

Age Period :—	10–20	20–30	30–40	40–50	50–60	60–70	70–80
Cases	4	4	1	1	2	1	1

The following table shows the length of onset of symptoms prior to notification :—

1 month	4
3 months	1
6 months	2
2 years	3
3 years	2
5 years	1
8 years	1

The following table shows the disposal of 59 cases notified during the last six years :—

YEAR.	No. of Cases.	Local.	Imported.	Died	Returned. Home.	Sent to Gedaref.	Under Treatment.	Untraced,
1928 ...	9	5	4	3	1	0	4	1
1929 ...	5	4	1	1	0	0	1	3
1930 ...	8	2	6	0	4	0	2	2
1931 ...	3	1	2	1	1	0	1	0
1932 ...	20	10	10	1	3	2	9	5
1933 ...	14	8	6	0	8	0	6	0
TOTAL	59	30	29	6	17	2	23	11

DISPENSARIES.

Khartoum North. The supervision of this dispensary has been taken over by the Medical Officer of Health. A medical officer is in charge of the dispensary.

Attendances. There were 860 in-patients in 1933 as compared with 1,094 in the previous year.

Outpatients numbered 48,062 as against 37,892 in 1932.

Fifteen deaths occurred amongst in-patients during the course of the year.

The assistant medical officers in charge of the dispensaries at Khileila and Geili have considerably extended their work and usefulness by means of numerous tours of the adjoining country. Medical attention has thus been brought to districts proviously somewhat remote. Each of these assistant medical officers has carried out a spleen survey in the neighbouring villages and has administered anti-malarial treatment when indicated. The average daily attendance at both dispensaries has been well maintained.

With the opening of the hospital at Gebel Aulia, the dispensary has been closed.

The dispensary at Gordon's Tree has proved of considerable value to the staff of the Egyptian Irrigation. Small numbers of natives from the adjacent villages have attended for treatment.

New dispensaries have been opened at Sururab West, Gereif East and Tuti Island. In each case the necessary buildings were provided by the natives of the village.

These dispensaries have proved very popular with the local inhabitants and attendances have been high. They should prove of great benefit to the public health in the province.

It is hoped, shortly, to open similar dispensaries at Deim Abu Sayed, Halfayet El Meluk, and El Ailafun in the northern area of the Blue Nile Province.

Khartoum North Central Prison. The medical supervision of this prison has been taken over by the Medical Officer of Health.

The prison is visited daily by the Medical Officer from Khartoum North Dispensary. A prison medical attendant works under his instructions.

General. The health of the prison has remained satisfactory. There has been no outbreak of epidemic disease. An increased attendance at out-patients was largely offset by a decrease in the number of prisoners detained in hospital.

A great majority of the attendances at out-patients were for minor injuries received in the course of work.

There were 9 primary cases of malaria and 212 relapsed cases. This condition can only be expected in a prison to which admissions are received from throughout the Sudan.

There were two deaths in the prison hospital during the year : one in an old and debilitated man with syphilitic aortitis and the other from heat-stroke. This figure compares with 4 deaths in 1932 and 14 in 1931.

The following table shows the attendances at out-patients, admissions to hospital and injections and special treatments performed :—

	1932	1933
Out-patients	23,117	31,307
In-Patients	334	266
N.A.B. Injections	225	149
Sobita Injections	—	168
Quinine Injections	408	706
Emetine Injections	62	125
T.A.B. Inoculations	—	242
Gonococcus Vaccine	—	62
Smallpox vaccinations	111	121

SCHOOL MEDICAL SERVICE.

Progress has been made in the school medical work. A slightly larger number of pupils was examined than in the previous year and adequate treatment has been, or is being, carried out.

Medical examination has been performed in the Gordon Memorial College, the Elementary Teachers Training School, the Omdurman Technical School, three primary schools, nine kuttabs and two mission schools.

2,140 pupils were examined and of these 1,573 were referred for treatment.

Apart from eye conditions, the health of school children in the three towns was satisfactory.

Most of the schools have been visited by a sanitary inspector and a report rendered on the general hygiene of the premises. The conditions found were in the main satisfactory.

Eye Diseases.

A considerable problem is presented by trachoma and defective vision. It will be seen from the first table that 50.3 per cent. of all pupils were suffering from active trachoma. In 20.9 per cent. there was some defect of vision. In many of these latter, however, the defect of vision was of a minor degree and was largely the result of trachoma and associated conjunctivitis. In such cases a great improvement in vision may be expected as the result of thorough treatment of the trachoma.

In all schools examined arrangements were made for the treatment of trachoma. Where possible treatment was carried out in the school. Two tumergis, specially trained in eye work, have been appointed. One of these has undertaken treatment of trachoma in the Khartoum schools, while the second has worked in Omdurman. In Khartoum North similar work is done by a sanitary barber.

In the remaining schools treatment was carried out in the dispensary attached to the school, by masters of the schools trained to apply simple remedies, or in the hospitals.

The second table gives an indication of the value of thorough treatment of trachoma. It shows the number of pupils in schools in which treatment had been in progress for 3 months or more at the time of 1933 examination, together with the number of cases of trachoma, quiescent trachoma and defective vision from these schools. The figures may be compared with those in the first table.

It has not been possible in the second table to include pupils who have newly entered the schools. Such boys have probably not received prolonged treatment and their inclusion may impair the value of the figures.

TABLE I.

		Percentage of total examined.
No. of schools and colleges examined	17	
No. of pupils examined	2,140	
No. referred for treatment	1,573	73.5
Trachoma	1,078	50.3
Quiescent trachoma	255	11.4
Conjunctivitis	54	
Defective Vision	448	20.9
Dental caries	202	9.0
Albuminuria (unclassified)	98	
Glycosuria	4	
Cardiac defect	30	
Pulmonary disease (Non-tuber)	12	
Splenomegaly	29	
Enlarged liver	2	
Infected tonsils	26	
Aural disease	10	
Skin disease	7	
Physical defects	22	
Unvaccinated	5	
Markedly bad Physique	2	
E. histolytica in stools	147	
T. nana in stools	22	
T. Saginata in stools	2	
Ancylostomiasis	1	
Urinary-bilharzia	2	

NOTE.—It was not possible to examine all cases for intestinal parasites.

TABLE II.

Schools in which prolonged treatment had been performed.

		Percentage of total examined.
No. of pupils examined	923	—
Trachoma	261	28.3
Quiescent trachoma	232	25.1
Defective vision	166	18.0

Midwifery Returns.

During the past year returns of midwifery cases attended have been made from the Omdurman Civil Hospital and the Midwifery Training School, Omdurman.

The results are summarized in the following tables :—

I. OMDURMAN CIVIL HOSPITAL.

A—Cases admitted direct to the hospital.

B—Cases admitted from the Midwifery Training School or sent in by a Training School Midwife from the town.

(1) Total Cases Attended.

	Normal.	Abnormal.	Recovered	Died.
A. ...	4	35	35	4
B. ...	4	39	39	4

(2) Births.

	Alive.	Stillborn.
A.	15	1
B.	18	5

(3) Abortions.

	Total Cases.	Septic.	Others.	Recovered	Died.	Cause of Death.
A. ...	18	2	16	17	1	Placenta praevia.
B. ...	16	—	16	16	—	

(4) Puerperal Sepsis.

	Total Cases	Normal Labour	Abnormal Labour	Recovered	Died	Strepto cocci	Gono-cocci	Not Ascertained
A. ...	4	2	2	4	—	1	—	3
B. ...	11	6	5	7	4	4	—	7

(5) Puerperal Haemorrhage.

	Total Cases	Placenta Praevia	Others	Multi para	Primi para	Recovered	Died
A. ...	4	2	2	3	1	4	—
B. ...	2	—	2	2	—	2	—

(6) Puerperal Albuminuria and Convulsions.

	Total Cases	Eclampsia	Others	Recovered	Died	Antonatal of Urine Yes	No	Eclampsia Cause of death
A. ...	3	1	2	3	—	3	—	
B. ...	4	2	2	3	1	4	—	Eclampsia

(7) Other Toxaemias of Pregnancy.

	Total cases.	Rec.	Died.
A.	1	1	—
B.	1	1	—

(8) (a) Phlegmasia Alba Dolens.
(b) Embolism and Sudden Death.

	Total Cases a.	b.	Rec. a.	b.	Died. a.	b.
A.	—	1	—	1	—	—
B.	—	—	—	—	—	—

(9) Other Accidents and Abnormal conditions of the Puerperal State.

	Total cases.	Recovered.	Died.	Accident or Abnormal Condition.
A. ...	1	1	—	Vesico-vaginal fistula.
B	5	5	—	Contracted pelvis 2, Uterine inertia 1, Rigid os. 1, Retained placenta 1.

(10) Illness Complicating, but not directly due to Childbirth.

	Total Cases	Disease.		Recovered	Died.	Pregnancy terminated	
						Yes.	No.
A.	10	Malaria	6	6	—	4	2
		Bilharzia	2	2	—	2	—
		Fibroids	1	1	—	1	—
		Myocarditis	1	—	1	1	—
B.	12	Malaria	5	5	—	3	2
		Dysentery	4	4	—	—	4
		Cystitis	1	1	—	—	1
		Colic	1	1	—	—	1
		Osteitis of Jaw	1	1	—	—	1

(11) Syphilis.

The Wasserman reaction was ascertained in 44 cases, including 17 cases of abortions. 42 were negative and only 2 positive.

II. MIDWIFERY TRAINING SCHOOL.

A—Cases attended in the school.

B—Cases attended outside by Training School Midwives.

(1) Total Cases attended.

	Normal.	Abnormal	Recovered	Died.	Transferred to Hospital
A. ...	396	80	471	—	5
B. ...	1159	33	1168	—	24

(2) Births.

	Alive.	Stillborn.
A.	465	20
B.	1172	32

(3) Abortions.

	Total Cases.	Septic.	Others	Rec.	Died.
A.	—	—	—	—	—
B.	22	1	21	22	—

(4) Puerperal Sepsis.

	Total Cases	Normal Labour	Abnormal Labour	Recovered	Died	Strepto cocci	Gono cocci	Not ascer tained	Trans To Hospital
A.	14	8	6	14	—	4	2	8	—
B.	2	2	—	2	—	—	—	2	—

(5) Puerperal Haemorrhage.

	Total Cases	Placenta Praevia	Others	Multi para	Primi para	Recovered	Died	Transferred To Hospital
A.	17	1	16	14	3	17	—	—
B.	6	1	5	5	1	4	—	2

(6) Puerperal Albuminuria and Convulsions.

	Total Cases	Eclampsia	Others	Reco vered	Died	Antenatal Exam Of Urine		Transfer To Hosp
						Yes	No	
A.	1	—	1	1	—	—	1	—
B.	—	—	—	—	—	—	—	—

(7) Other Toxaemias of Pregnancy.

	Total Cases.	Recd.	Died.	Transferred to Hospital.
A. ...	2	2	—	—
B. ...	—	—	—	—

(8) (a) Phlegmasia Alba Dolens.
(b) Embolism and Sudden Death.

	Total Cases.		Recd.		Died.		Trans.	
	a.	b.	a.	b.	a.	b.	a.	b.
A.	1	—	1	—	—	—	—	—
B.	2	—	1	—	—	—	1	—

(9) Other Accidents and Abnormal Conditions of the Puerperal State.

	Total Cases.	Recovered.	Died.	Transferred to Hospital.
A.	73	71	—	2
B.	6	2	—	4

Ante-natal Work.

The total attendance at the Ante-natal clinic was 1,116. Of this number 629 were new cases, an increase of 262 on the previous year.

METEOROLOGICAL OBSERVATIONS
AT
STACK MEMORIAL RESEARCH LABORATORIES, KHARTOUM.
1933.

Month.	Temperature in Degrees Fahrenheit				Average Relative Humidity % at 8 a.m.	Average Evaporation in mms.	Rains in mms.	Haboobs and Sand storms	Prevailing Winds
	Highest Max.	Average Max.	Lowest Min.	Average Min.					
January ...	103.3	96.6	58.8	66.6	45	9.9	—	—	N.
February...	108.2	96.8	54.1	63.8	31	10.8	—	1	N-NNE
March ...	110.6	102.2	64.4	69.5	20	13.5	—	2	N-NE
April ...	111.2	104.2	62.0	70.0	14	15.2	—	1	N.
May ...	113.2	108.6	70.2	79.1	27	14.6	5.1	5	N.
June ...	112.9	106.2	70.0	79.6	40	15.6	16.9	8	S-SW
July ...	108.4	101.7	70.0	77.9	54	12.4	9.5	3	SW
August ...	105.6	95.4	68.4	75.4	69	8.6	87.9	2	SW
September	108.2	100.6	70.4	75.8	53	10.4	4.6	1	1st.-15th. S-SW 16th.-30th. Veer.
October ...	108.2	104.2	73.8	76.3	40	11.2	1.1	2	1st.-15th. Veer. 16th.-31st. NE-NW
November	103.1	99.8	67.1	71.3	40	9.9	0.5	—	NNE-NNW
December	101.7	94.1	55.6	63.8	38	0.3	—	—	NNW
TOTAL							125.6	25	Max. Wind Velocity 70 k.m. per hour

CONSERVANCY AND REFUSE DISPOSAL.

The conservancy work was carried out in a satisfactory manner throughout the year.

64 buckets were installed in new latrines throughout the year.

The average number of daily clearances totalled 6,060—a decrease of 67 as compared with last year. This decrease is explained by an extension of the pit latrine system in Omdurman and in parts of Khartoum North.

The standard of scavenging and refuse disposal has been well maintained. In Omdurman and Khartoum North the old refuse carts have been replaced by the new all-metal type of vehicle and the work of collection and disposal has been much facilitated.

The collection and disposal of garden refuse and street tree clippings remained a serious problem. The installation of incinerators at various parts of the town for the disposal of garden refuse has eased matters considerably, but further action will have to be taken before this problem is solved.

MARKETS.

A satisfactory standard of cleanliness has been maintained. Difficulty has again been experienced with the waste water from the meat and offal markets. The three soakage pits could not cope with the quantity of water and frequently filled up and required pumping out.

The floor of the meat market has been relaid with concrete slabs and is now in a satisfactory condition.

DINING CARS ON TRAINS.

The inspection of dining cars and kitchens on trains was continued. Detailed instructions in cleanliness for the servants have been displayed in their quarters. The conditions generally were very satisfactory.

UNSOUND FOOD.

The following is a note of the unsound food destroyed during the year :—

	lbs.
Khartoum	8,416
Khartoum North	835
Omdurman	224

MINERAL WATER FACTORIES.

There are 7 of these factories in the three towns, 4 in Khartoum and 3 in Omdurman. A high standard of cleanliness was maintained throughout the year and few complaints were received regarding the minerals supplied.

BAKERIES.

The total number of bakeries in the three towns is as follows :—

	European	Native.
Khartoum	8	11
Omdurman	13	36
Khartoum North	6	5

The standard for new bakeries has been rigidly enforced and wherever possible attempts have been made to bring older premises up to standard.

MILK SUPPLY.

There are 492 milk vendors in the three towns, distributed as follows :—

Khartoum	242
Omdurman	186
Khartoum North	64

The following milk samples were taken during the year :—

Khartoum	175
Omdurman	106
Khartoum North	114
TOTAL	395

This is an increase of 5 as compared with 1932.

Of samples taken in Khartoum 24 or 13.7 per cent. were below standard and the average presumed extent of adulteration was 4.7 per cent. added water.

The Omdurman figures are 25 or 23.6 per cent. and 4.9 per cent. respectively while those of Khartoum North are 31 or 27.9 per cent. and 6.30 per cent.

The following is a comparison of adulterated samples in the three towns in 1932 and 1933 :—

	1932	1933	
Khartoum	26.0%	13.7%	a decrease of 12.3 per cent.
Omdurman	21.5%	23.6%	an increase of 2.1 per cent.
Khartoum North	20.0%	27.9%	,, ,, ,, 7.9 per cent.

Proceedings were issued in 50 cases of adulteration. Warning was issued in the remaining 30 cases which were but slightly below standard.

RESTAURANTS, EATING HOUSES AND COFFEE SHOPS.

The eating houses and coffee shops in Khartoum have now settled down to the new conditions inaugurated in 1931. The premises are easy to keep clean and regular inspections by British and Native staff ensured the maintenance of a satisfactory standard.

The total number of licensed premises in Khartoum at the end of the year was :—

Coffee Shops "A" Standard	15
,, ,, "B" ,, ...	8
Eating Houses "A" ,, ...	10
,, ,, "B" ,, ...	6
TOTAL	39

INSANITARY PREMISES.

The progress made in 1933 in the clearance of insanitary premises was considerable, but the position is still far from satisfactory. Numerous insanitary properties are yet in existence and sub-letting, with its attendant evil, overcrowding, remains unchecked. As I stated in my last report subletting is most prevalent in the type of house least fitted to stand this form of abuse.

There is adequate accommodation available in the Deims, but the native, having experienced the benefits of living in the City is reluctant to move out to the Deims although the rental of a house in the Deims is considerably less than is often paid for a single room in Khartoum.

The further development of the Deims, together with the introduction of legislation to prevent the abuse of sub-letting, offers, in the future, a solution of the problem of insanitary premises in Khartoum.

RURAL DISTRICT.

The new box car approved for the use of the Sanitary Inspector on the Rural District has been of great value and has considerably facilitated the work.

As noted elsewhere in this report the regular practice of oiling all pools likely to form breeding places for the anopheline mosquito resulted in a decrease of nearly 50 per cent. in the infected pools found as compared with 1932.

The areas north of Khartoum have given little trouble throughout the year. The bulk of breeding places in the Rural District were along the Blue Nile.

It is hoped shortly to extend our area of anti-mosquito control into the Blue Nile Province as far as Masid. I am confident that this measure will result in a great improvement in the number of mosquitoes gaining access to Khartoum from the south.

CONCLUSION.

The standard of sanitation throughout the province has, in spite of the reduction of staff, been well maintained.

The work during 1933 was greatly increased by the smallpox epidemic at the beginning of the year and by the increased incidence of malaria. That all demands made upon the Service were satisfactorily met reflects the greatest credit upon the work of the reduced personnel.

(b) PORT SUDAN

Population 19,000.

There were no severe epidemics, and the general health remained good.

FLY BORNE DISEASES.

Rains were heavy this year and fly breeding was extensive in the autumn months.

The figures for 1931, 1932 and 1933 are :—

YEAR.	Amoebic dysentery.	Bacillary dysentery.	Typhoid fever.
1931	25	46	9
1932	9	28	13
1933	29	33	2

CONSERVANCY.

Water borne system :—

Septic Tanks	44
Cesspits with water closet connections	57

Of the septic system, that at the Railway Hotel, which is the oldest in the Town, has given no trouble this year. The septic tank in the East Quays enclosure near No. 11 shed has had its effluent pit emptied from time to time throughout the year. The septic tank in the East Quays enclosure near the main dock gates has given no trouble. Its effective septic tank capacity was increased from 640 cu.ft. to 2,040 cu.ft. in January 1933.

Double Bucket System.

No change.

Pit Latrines.

There are 56 deep pit latrines in Deim El Warshat, of these 20 are fitted with cement tops made from a mould supplied by us. It is hoped to get cement tops fitted to all these latrines in 1934.

MOSQUITOES.

The pools of sea water at the south west end of the harbour have been infected with anopheles and culex larvae from time to time throughout the year.

The following tables give details of infestations found and dealt with during the year :—

MONTH.	No. of infections of larvae.	No. of infections of pupae.	A.	S.	C.	Total.
January	9	1	—	5	5	10
February ...	9	1	1	7	2	10
March	18	1	2	7	10	19
April	11	—	—	7	4	11
May	15	2	1	13	3	17
June	26	—	1	24	1	26
July	41	—	—	38	3	41
August	17	1	—	17	1	18
September ...	5	1	—	3	3	6
October	6	—	1	4	1	6
November ...	20	1	—	5	16	21
December ...	24	4	2	5	21	28
TOTAL	201	12	8	135	70	213

RATS.

The rat population is being kept within reasonable limits. 6,454 rats were caught during the year.

The following tables give details of distribution etc. :—

MONTH.	West Town.				East Town.					
	Shops etc	Vill-ages	Other places	TOTAL	Quays encl.	Deim Hashish	Other places	TOTAL	Sth Town	TOTAL
January ...	164	182	—	346	27	239	81	347	45	738
February ...	99	127	42	268	44	149	130	323	54	645
March	106	260	10	376	16	166	101	283	54	713
April	101	54	159	314	49	185	62	296	47	657
May	118	145	170	433	97	149	89	335	16	784
June	92	62	146	300	42	90	89	221	34	555
July	55	95	82	232	25	99	29	153	18	403
August ...	43	133	34	210	12	83	25	120	19	349
September ...	69	84	11	164	10	59	28	97	31	292
October ...	72	129	—	201	18	67	49	134	35	370
November ...	83	142	2	227	25	91	32	148	10	385
December ...	178	159	—	337	49	150	20	219	7	563
TOTAL ...	1180	1572	656	3408	414	1527	735	2676	370	6454
	% 18.3	% 24.4	% 10.1	% 52.8	% 6.4	% 23.7	% 11.4	% 41.5	% 5.7	

Rattus rattus rattus	1,429	*i.e.*—22.1%.
Rattus rattus Alexandrinus	1,592	*i.e.*—24.7%.
Rattus rattus frugivorous	3,433	*i.e.*—53.2%.

Rat Fleas.

The flea census per month together with the prevailing atmospheric conditions was as follows :—

MONTH.	Fleas per rat.	Average Temperature Shade.		Average Relative Humidity.
		Maximum °F.	Minimum °F.	
January	0.9	80.5	68.0	74.7
February	1.0	82.1	67.9	75.1
March	0.7	84.6	68.8	62.5
April	1.3	85.9	68.0	53.2
May	1.1	96.8	73.8	50.4
June	1.2	102.3	78.7	64.2
July	0.6	103.0	80.7	52.2
August	0.8	104.4	83.9	49.0
September	1.1	100.4	78.8	40.7
October	0.8	91.0	76.5	59.5
November	1.1	87.1	72.7	67.6
December	1.2	84.6	71.9	61.7

(c) ATBARA

Population 14,000.

FLY BORNE DISEASES.

4 cases of typhoid fever occurred in Sayala and Dakhla, villages adjacent to Atbara. The usual precautions were taken including the sinking of many auger bore latrines. Otherwise the incidence of typhoid fever and dysentery was low.

WATER SUPPLY.

The drinking water is obtained from the Nile and is sedimented and chlorinated but not filtered. Regular bacteriological and chemical examinations are carried out. It is hoped that a filter will be installed as soon as funds are available.

CONSERVANCY (CANTONMENT AND TOWN).

Single Bucket system with bucket clearance once or twice in 24 hours works satisfactorily. Crude fuel oil is used as a deodorant over the carts and also as a preservative inside the buckets. This has been found to lengthen the life of a bucket very considerably.

CONSERVANCY (DAKHLA AND SAYALA VILLAGES).

Auger bore latrines, public and private, supply the villagers.

ANTI-MALARIAL WORK.

The following are the principal sources of mosquitoes :—

1. The main Nile foreshore from Aked to Kanour.
2. River Atbara for five miles.
3. Fadlab irrigation scheme and the northern part of the Timerab extension of the Zeidab scheme.
4. Rocks in the cataracts at low Nile.
5. Water wheels along the river.
6. Native boats.
7. Islands to the north which are flooded out at the peak of the flood.
9. Domestic water supplies for houses and gardens.

Crude oil and Anti-Malarial mixture are used as larvicides.

INSECT PESTS.

40 gallon empty drums smeared inside and out with oil are placed along the river bank to act as traps for insects. This, combined with the application of Pesterine to the mud along the river edge has abated the nuisance somewhat.

Sandflies are diminishing by means of the regular oiling the garden syphons receive. This trace of oil when spread over the garden seems to act as a deterrent.

(d) WAD MEDANI

Population 33,000.

The incidence of typhoid and dysentery was below average.

CONSERVANCY.

The double bucket system serves the Medani Town area, and a single bucket system is in use in isolated parts of the native area where it is impossible to extend the double bucket system owing to narrow lanes and numerous dry river beds preventing the passage of bucket carts. A definite programme has been drawn up for the replacement of bucket latrines by deep pit latrines where possible, and 350 new pit latrines were constructed during the year.

WATER SUPPLY.

A new piped water supply was installed last year. The water is piped from the river, filtered and chlorinated. Regular bacteriological and chemical examinations are carried out. In October the water was found to be not up to standard and as a result various small adjustments have been made in the purification process which it is expected will remedy matters.

MOSQUITO PREVENTION.

The following statement shows the number of mosquito infections found in the Wad Medani area during the year :—

Sites of infection.	Anoph-elene.	Culex.	Stego-myia.	Total	Percentage of anophe-lene inf.
Pools	1329	419	2	1750	76
Garden Gadwals and Pits...	414	571	—	985	42
Zeers, Tanks and other receptacles	3	75	1	79	4
Boats	3	24	—	27	11
Wells	1	5	—	6	17
Total	1750	1094	3	2847	61

This year an earth embankment was built by prison labour along the river edge of the Police Gardens and native cultivations east and west of the Irrigation Offices and, during the high Nile, was of great service in reducing the number of mosquito infections. These cultivations were invariably flooded in previous years and large expanses of water lay there for weeks on end.

GEZIRA.

The sanitation of this thicky populated district is of paramount importance to prevent the infection of the indigenous population with bilharzia. The most satisfactory method of conservancy has been found to be the deep pit latrines. Borehole latrines fill up rapidly, and the bucket system is impracticable outside the big towns and not altogether satisfactory in any case.

It was impossible to deal with every village at once, so those near canals were first dealt with, and in particular those villages which were shown from the annual bilharzia survey to be foci of local infection.

Six and eight seater latrines for males and females were dug between the village and the canal.

19 public latrines have been constructed to date.

Experimental bunker latrines have been dug near selected villages in the northern part of the area. This method of sanitation is primitive but effective.

Many temporary villages at present are situated close to canals. These will be moved to selected sites at least 300 yards from the nearest canal as soon as possible.

By this means it is hoped that the fouling of canals will be avoided and that the inhabitants will use wells for washing and drinking purposes in preference to the distant canal.

(e) GEBEL AULIA

A 70 bedded hospital was opened at Gebel Aulia in October and the necessary medical and sanitary staff were provided.

The population had reached 3,800 by the end of the year.

CONSERVANCY.

A double bucket system serves the colony and the adjacent market.

A trough water flushing system with septic tanks has been installed in the Egyptian labourers' camp where owing to rock deep pit latrines could not be properly constructed.

WATER SUPPLY.

Water is pumped from the river above the colony to a reservoir. At present the water is treated with chlorescine and ammonium chloride. A filtration and chlorination system will be introduced as soon as possible.

ANTI-MALARIAL WORK.

At first a large number of anopheline infections were found in houses in the colony owing to faulty disposal of waste water, but this was at once rectified.

Pools and holes in the vicinity of the dam left by the falling river required constant supervision.

Culex infections were found in pools at the river edge, but no Stegomyia have been found to date.

MALARIA.

78 cases were treated, of whom five contracted the disease locally.

Of these confirmed microscopically eight were Benign Tertian, twenty-six Malignant Tertian and four Quartan.

(5) REPORTS ON SPECIAL SUBJECTS

(a) STREPTOCOCCAL SEPTICAEMIA OCCURRING IN HALFA PROVINCE.

An outbreak was reported in June which was characterised by fever, swelling of the glands, and a high mortality. As cases of plague had been reported in Arminna, near Abu Simbel in Egypt about 30 miles from Wadi Halfa, Dr. Horgan of the Wellcome Tropical Research Laboratories at once proceeded to Wadi Halfa to carry out a bacteriological investigation.

He reported as follows :—

1. That the outbreak was closely associated with a virulent streptococcus.
2. There was no evidence, clinical or bacteriological, of bubonic plague.

15 cases with five deaths were reported.

(b) YELLOW FEVER INVESTIGATIONS.

Blood sera were collected from selected towns along the main air-route and in the Bahr el Ghazal and examined for immunity against Yellow Fever at the Rockefeller Institute, New York.

The following results were shown :—

Town.	No. taken.	Positive.
Wau	27	7
Rumbek	30	17
Khartoum	36	1
Wad Medani	3	0
Malakal	50	1
Kosti	26	4
Juba	55	6

The results to date according to this test indicate that the disease has not occurred in Juba during the past twelve years and that it probably has not existed in the lifetime of this generation in Khartoum, Kosti, and Malakal.

The results at Wau and Rumbek cannot yet be analysed until the tests are reported by age-groups, as all the sera were from persons over 20 years of age.

Despite every effort no case of the disease has been diagnosed either clinically or pathologically in any part of the Sudan during the year.

(6) OPHTHALMIC REPORT

27 male beds are provided for eye patients, at the River Hospital Khartoum, and a 20-bedded female ward will be allotted for this purpose early in 1934.

161 admissions and 11,044 outpatient attendances were recorded in 1933 ; 180 operations were performed.

TRACHOMA.

The majority of these cases were dealt with in the outpatient department but the severe cases complicated by iritis, marked pannus, keratitis and ulceration were admitted to hospital.

The usual treatment in outpatients was painting of the lids every day with Copper Sulphate 10 per cent. in Glycerine alternating with Chaulmoogra oil, but in certain cases especially Tr. II (MacCallum's classification) with large gelatinous follicles and papillary enlargement, painting of the lids for the first 3 or 4 days with finely powdered Sodium Chloride applied by means of cotton wool dipped in Glycerine was tried before going on to Copper Sulphate and Chaulmoogra painting. Average length of treatment is one month.

The treatment is very painful and it is difficult to get the patients to attend regularly.

CONJUNCTIVITIS OTHER THAN TRACHOMA.

Phlyctenular conjunctivitis is fairly common amongst children. The most common organism found in the mucopurulent conjunctivitis is Koch-Weeks B. Very few cases of Gonorrhoeal conjunctivitis were seen and only two cases were admitted to hospital, one adult, one baby.

LID DISEASES.

Most Trichiasis and Entropion cases were treated as outpatients but some with still active trachoma were admitted to hospital for treatment preliminary to operation, 14 in all.

Pterygia are common and are treated as outpatients. McReynolds operation is the one of choice.

DISEASE OF THE CORNEA.

Most of the corneal complications seen were sequelae of trachoma but marginal ulcers are common in the late mucopurulent conjunctivitis cases.

Hypopyon ulcer does not appear to be frequent and only one case was admitted to hospital.

One **Moorens Ulcer** was admitted to hospital.

Five cases of a peculiar granulating overgrowth of conjunctiva over the edges of the cornea were admitted to hospital. This overgrowth completely surrounded the cornea reducing the transparent area to, in one case, a circle of 4 mm. Operative measures consisted of shaving off this overgrowth and a smooth corneal surface was found underlying it.

Only two cases of true interstitial keratitis of luetic origin were seen in 1933.

IRITIS.

Most cases were seen as complication of trachoma. Two cases of iritis in which the Kahn Test was negative were admitted to hospital, one with history of recent malaria and the other with Amoebic dysentery.

CATARACTS.

36 noncomplicated cataracts were admitted to hospital and operated on. A great number more were seen but it is difficult to persuade the people to enter

hospital for operation. **Cataracts complicating glaucoma** were admitted to the number of 18. **Glaucoma** 16 cases were admitted to hospital for operation but a great deal more were seen. Unfortunately most cases were too far gone for any improvement to be made in the condition. **Acute Glaucoma** in the height of an attack was only seen in one case.

RETINO CHOROIDITIS.

Two cases were admitted to hospital and repeated Kahn tests were negative, urine and faeces negative. History unsatisfactory.

OPTIC NEURITIS.

One case with Kahn ++++ was admitted to hospital but optic atrophy was already setting in ; another case, a Nigerian from Onitsha, was admitted at the end of this year with optic neuritis haemorrhages and exudation. Kahn negative. Blood pressure being 240/140, case still under investigation. He attributes the condition to getting cement in his eyes.

PENETRATING INJURIES OF THE EYE.

10 in number were admitted to hospital. One case developed a sympathetic ophthalmia.

TUMOURS.

One granulating sarcoma of the orbit was admitted to hospital and an excentration of the orbit was done.

One case of what appeared to be pituitary tumour with hemianopia was seen but would not come to hospital for a more thorough investigation.

The following is a short summary of Dr. Bryant's investigation in the Rumbek District Bahr el Ghazal Province.

Summary of knowledge up-to-date of the action of the unknown toxin on the eye and the appearance of the fundus in Sudan Blindness.

The course of the disease has already been described in the 1932 Annual Report.

It is believed that the toxin completes its work in a comparatively short time—usually from 2-5 months from the beginning of lachrymation. The progress of the disease then comes to an end and the condition remains stationary.

The toxin appears to attack the uveal tissue, the nervous structures of the eye being affected later. Optic atrophy follows the choroidal inflammation.

It is unfortunate that only one case had been seen at the commencement of the disease and it was impossible to get him to hospital for investigation.

It will be noted from these records that the changes in the fundus bear no relationship to the degree of impairment of vision. The very grossest changes in the fundus will not necessarily be accompanied by complete blindness, neither are the adhesions of the iris an index of the severity of the fundus changes.

The main characteristics of the appearance of the fundi examined with an ophthalmoscope are as follows :—

(1) The rough ploughed up appearance of the fundus, the choroidal vessels standing up become brightly illuminated as they shine through the retina which appears either grey or deeply inflamed and very thin. The colour of the fundus

is very variable in this condition but then the colour of the normal fundus in Nilotics and the Zande tribe varies greatly also in individuals of the same race.

(2) Black pigment either in little spots or streaks or great shaggy masses are scattered about the fundus. The optic disc is frequently surrounded by pigment but this also appears in normal eyes. Large masses of pigment are occasionally seen lying on the retinal vessels but as a rule the pigment, which resembles soot, is irregularly scattered perhaps only one or two small masses being seen in an eye in which all vision has been destroyed.

(3) The occasional presence of white patches crossed by the retinal vessels. These are due to exposure of the sclera. Black pigment is found in these patches and the edges of the areas are occasionally coloured a dirty green. Again, very large solitary white areas or multiple small ones have been seen where the patient has been able to see people at 40 to 100 feet in good light.

(4) The pallor of the optic disc varies, but a distinct pink tinge is sometimes left round the exit and entrance point of the retinal vessels which in many cases are much diminished in size.

ONCHOCERCIASIS AND SUDAN BLINDNESS.

It has been found that Sudan blindness is a localised disease associated with people who live along rocky streams. Where Sudan blindness has been found there also onchocerca volvulus has been found.

In Tembura District 9 per cent. of adults suffered from onchocercal manifestations, but when those suffering from Sudan blindness were examined 57 per cent. showed signs of this parasite.

Onchocercal keratitis has been found to be greatly relieved by removal of tumours. One cannot expect scar tissue to resolve from a damaged cornea, but from the few cases observed after operation the relief of pain and lachrymation has been very marked indeed.

It has been noted in the Sudan blindness that the disease runs a very rapid course.

There is irritation and lachrymation for two or three months followed by night blindness going on to very severe impairment of vision or complete blindness in from two to five months. The process becomes complete in this period and does not progress, or if it does so, progresses very slowly. It may safely be said that the condition is always bilateral and this would point to a generalised systemic and not a local cause, whereas onchocercal keratitis is occasionally unilateral. Only one case has been seen where Sudan blindness was present in one eye only. No ophthalmoscope was available but the history was typical.

Night blindness is a constant symptom in Sudan blindness, but in the early stages of onchocercal keratitis, vision is better in poor light as the photophobia is less severe than in sunshine.

Again the cornea in Sudan blindness is always clear unless from injury or extraneous cases, or atrophic changes in those who have been blind for many years. Irido-cyclitis occurs in both conditions.

On account of these differences I considered the two conditions as separate entities, but owing to their distribution being the same, suspicion falls heavily on *O. volvulus* as the cause of both. One case has been seen where onchocercal keratitis was followed years later by a typical retino-choroiditis. This case has been recorded in detail.

(7) PROGRESS OF MEDICAL WORK

The following table shows the numbers of inpatients and outpatients, and the operations performed, during the last 10 years.

Year.	Admissions to Hospitals.	Outpatient Attendances.	Operations.
1924	19,827	394,418	2,099
1925	18,637	470,697	2,565
1926	21,738	833,990	3,027
1927	26,023	1,096,839	3,445
1928	39,845	2,004,283	3,913
1929	46,033	2,675,085	4,337
1930	49,929	3,840,923	6,110
1931	59,763	4,044,439	6,798
1932	59,642	4,264,412	7,287
1933	70,315	5,092,999	8,609

In spite of the drastic economies during the last three years the medical work continues to increase. As it is difficult to carry out even the most urgently required hospital extensions at present, and as the hospital accommodation is already fully occupied, a careful readjustment of facilities has been necessary to enable further medical expansion to be carried out without an increase in qualified staff and hospital buildings This has entailed the immediate increase in the number of dispensaries in many districts. The dispensaries relieve the pressure on the hospitals in several ways. Sick report earlier, and inpatient treatment is avoided, as the disease is cured at an early stage. This particularly applies to chronic ulcers, and wounds. The hospitals can discharge many patients from the wards who no longer require inpatient treatment provided a dispensary is available near their homes to complete treatment. On the other hand cases are seen at dispensaries, who require and are given hospital inpatient treatment who would not otherwise have been treated.

Nevertheless the result of the readjustment has been an increase in outpatients, inpatients and operations without a corresponding increase in the number constantly sick in hospital, and every patient is treated at the place and in the way which best suit his disease and convenience. In this way it should be possible to deal with the increase in work which is expected during the next few years without requiring a corresponding increase of hospital accommodation.

During 1933 the number of dispensaries has increased from 197 to 234.

This year Halfa Province has been brought up to the same standard as its neighbours and the medical organisation of the northern and central Sudan is now fully developed. Adequate facilities exist for dealing with any emergency locally, and for treatment of the natives in all districts.

Preventative measures against bilharzia, malaria, and other diseases are carried out on an extensive scale.

In the southern Sudan the work is increasing rapidly, and it is anticipated that this area will come into line with the north in a few years time.

DISPENSARIES.

39 new dispensaries were opened during the year, and 4 were transferred to fresh sites to cope with shifting population.

New Dispensaries.

Bahr el Ghazal.

- Meshra
- Kashwal
- Toinya
- Ibba
- Buma
- Said Bandas
- Migida
- Nyin Akok
- Won Rog
- Gangura
- Ngindo
- Badagbo
- Yambio

Berber :

- Atmoor
- Timerab
- Abidia
- Darmali
- Gadalla
- Mograt Island

Halfa :

- Suarda
- Akasha
- Fareig

Blue Nile.

- Wad Rawa.

Darfur :

- Id El Ghanam
- Meidob

Dongola :

- Binna
- Kuddi
- Haffir
- Kulgeili
- Lebab

Fung :

- Abu Tiga

Khartoum :

- Burri
- Gereif
- Deims
- Sileitat
- Tuti Island

Kordofan :

- Tira El Akhdar

White Nile :

- Shegeig
- Turaa

Dispensaries transferred :

Wad Ben Naga	to Gandettu
Kebbe	to Gongor
Fazogli	to Fezzan
East Bank Dispensary (Blue Nile)	to Shabarga

NEW BUILDINGS.

The following additions were made to buildings during 1933 :—

Bahr el Ghazal :

Wun Rog —Dressing station in mud and thatch.
Nyin Akok ,, ,, ,, ,,
Tonj —Dispensary rebuilt in red brick with cement floor.
Aweil —Outpatient Department and small operating room rebuilt in red brick with cement floor.
Li Rangu —Mud wards rebuilt in red brick.
Tembura — ,, ,, ,, ,, ,,

Dongola :

Dongola Hospital—New male ward and isolation block.

Fung :

Dispensaries at Sukki and Attib are being rebuilt.

Halfa :

Permanent buildings to house dispensaries were erected as follows :—

Dobeira
Suarda
Akasha
Fareig

Kordofan :

Suga El Gamal —Dispensary in mud brick.
Abu Zabad —1 thatched ward.
Kadugli —10 Red brick, steel framed, tukl wards.

Suakin :

Wooden shelters were built for the watchmen in the quarantine compounds.

White Nile :

Kosti 4 Tukl wards.

(8) MEDICAL WORK CARRIED OUT BY MISSIONS

MISSION HOSPITALS.

(1) Omdurman (Church Missionary Society).

STAFF :

3	Doctors	1	Dispenser
3	Nurses	1	Housekeeper

Beds	60
Inpatients	1,261
Outpatients	40,346
Operations	231

This hospital maintains its high standard of work.

Welfare clinic	515 attendances.
Abu Rof Dispensary	17,981 attendances.

The Welfare clinic is of particular benefit to the inhabitants of Omdurman.

(2) Lui, Mongalla Province (Church Missionary Society).

STAFF :

One British Doctor.

LUI.

Outpatient cases	2,700
,, attendances	18,470
Major operations	117

DISPENSARIES.

Outpatient cases	19,069

This hospital with its ten subsidiary dispensaries continues to do valuable work among the Moru tribe.

The high standard of work, the efficient and economical organisation and the resulting popularity among the natives were fully maintained.

(3) Melut (Sudan United Mission).

STAFF :

One British Doctor.

Inpatients	209
Outpatients	5,350
Operations	44
Injections	588

(4) **Akot, Upper Nile Province** (Church Missionary Society).

STAFF :

One British Doctor.

Inpatients	542
Outpatients	17,738
Operations	53

(5) **Western Nuer, Upper Nile Province** (Church Missionary Society).

A British Doctor has been stationed in this district, where a small hospital has been opened.

(6) **Moro Hills, Kordofan Province.**

The Sudan United Mission posted a doctor to this district in December and a small hospital has been opened.

MISSION DISPENSARIES.

(1) **Khartoum North** (American Mission)—at the girls boarding school.

(2) **Kordofan Province** (Sudan United Mission)—at Abri, Heiban and Tabanya.

Inpatients	292
Outpatients	64,848

(3) **Upper Nile Province** (Italian Mission).

	Inpatients.	Outpatients	Injections.
Detwok	11	5937	158
Yoynyang	204	3700	729
Lul	—	7654	—

(4) **Upper Nile Province** (Sudan United Mission) **at Rom.**

Outpatients	778
Injections	23

(5) **Upper Nile Province** (American Mission) **at Doleib-Hill.**

Outpatients	1,329
Injections	126

(9) VITAL STATISTICS.

The returns of births and deaths can only be considered to be in any way correct in Khartoum, Berber and Dongola Provinces and in Wadi Halfa District. The returns for the Blue Nile Province are in still very incomplete; they are included in the list given below, but it would not be safe to draw any conclusion from them :—

NON-EUROPEAN VITAL STATISTICS.

PROVINCE.	1930		1931		1932		1933	
	Total.	Rate.	Total.	Rate.	Total	Rate.	Total.	Rate.
Khartoum :—								
Births	4574	18.5	5071	20.3	4959	17.8	5147	20.4
Deaths	2316	9.3	2862	11.4	2399	8.6	2857	11.3
Still births ...	203	44.3	202	39.8	163	32.8	130	25.2
Infantile mortality	238	52.0	405	79.8	287	57.8	428	83.1
Berber :—								
Births	5284	34.9	6275	41.4	5721	34.5	6606	37.7
Deaths	2557	16.8	3004	19.7	2878	17.3	4031	23.0
Still births ...	127	24.0	112	17.8	95	16.6	126	19.1
Infantile mortality	282	53.4	526	83.8	474	82.8	565	85.5
Dongola :—								
Births	5935	36.4	6732	41.2	6005	37.9	6187	33.0
Deaths	2637	16.4	3029	18.8	2729	17.1	3050	16.2
Still births ...	273	46.0	344	51.1	335	55.7	268	43.3
Infantile mortality	433	73.0	620	92.1	623	103.7	581	93.9
Blue Nile :—								
Births	15328	43.5	18306	51.9	10255	20.6	5647	11.1
Deaths	9668	27.4	9908	28.0	5948	11.9	4106	8.1
Still births ...	241	15.7	402	21.9	186	18.1	98	17.3
Infantile mortality	385	25.1	900	49.1	637	62.1	430	76.1
Wadi Halfa Merkaz :—								
Births	828	20.1	904	21.9	785	15.0	765	11.9
Deaths	451	10.8	494	11.8	460	8.7	567	8.8
Still births ...	6	7.2	4	4.4	10	12.7	14	18.3
Infantile mortality	79	95.4	124	137.1	120	152.8	163	213.0

Shows the births, deaths by ages and still–births of Khartoum, Berber, Blue Nile and Dongola Provinces, and of Wadi Halfa Merkaz, which are considered to be approximately correct.

NATIONALITY.	Births.		Deaths by ages.							Total deaths.		Total still-births	
	Male.	Female.	Under 1 year	1-5	5-10	10-20	20-40	40-60	Over 60	Male	Female	Male	Female
British	4	3	—	—	—	—	3	3	—	4	2	—	—
Greek	16	11	2	—	—	—	2	3	2	8	1	—	—
Other Europeans	7	6	1	1	—	—	—	1	1	3	1	—	—
Egyptians & Syrians	204	166	25	17	3	7	12	20	22	60	46	1	3
Natives of Sudan	12453	11242	2125	2052	745	852	2478	2249	3819	7137	7,183	389	242
All others ...	151	136	17	21	7	13	41	48	38	102	83	1	—
Total	12835	11564	2170	2091	755	872	2536	2324	3882	7314	7,316	391	245
Grand Total...	24399		14630							14630		636	
% deaths by ages..			14.8	14.2	5.1	5.9	17.3	15.8	26.5				

(10) MEDICAL EXAMINATION OF SCHOOLS.

18,160 children were examined and treated compared with 13,458 in 1932. The increase is due to efforts made to examine every school child in the country once a year. A depleted staff has made this expansion difficult, but the importance of this work to the health of the educated community is so great, that every effort has been made to complete it.

Trachoma and its treatment is the biggest problem that these examinations produce. It is still far too common particularly in Khartoum and Halfa provinces. In the former province treatment has been carried out under the direct supervision of the Government Opthalmologist with more striking results than the figures would indicate. Active trachoma has become quiescent, and bad trachoma slight. These types of cases although still shown as trachoma are now relatively harmless and are not likely to produce the unfortunate sequelae of this disease. The medical administration of Halfa Province has been greatly expanded during the present year and one of its most important duties will be to reduce the incidence of trachoma in that province.

The following table shows the result of medical examination of pupils in one secondary, one technical, 11 intermediate, 72 elementary and 196 village schools during 1933 :—

PROVINCE.	Number examined.	Trachoma. No	Bilharzia. No.	Spleen. No.	Pulmonary Tuberculosis. No.	Ankylostoma. No.
Bahr El Ghazal :—						
1 Elementary ...	152	—	—	33	—	1
Berber :—						
3 Intermediate ...	200	147	11	27	—	—
9 Elementary ...	903	666	10	55	—	—
24 Village	958	488	16	206	—	—
Blue Nile :—						
2 Elementary ...	331	99	1	27	—	—
1 Mission School	179	17	—	4	—	—
1 Girls School ...	123	8	—	2	—	—
65 Village	3078	1178	30	1479	—	—
Darfur :—						
1 Elementary ...	108	37	58	54	—	—
2 Village	337	208	105	117	—	—

PROVINCE.	Number examined.	Trachoma. No.	Bilharzia. No.	Spleen. No.	Pulmonary Tuber-culosis. No.	Ankylos-toma. No.
Dongola :—						
8 Elementary ...	689	332	65	104	—	1
Fung :—						
3 Elementary ...	205	18	1	169	—	—
7 Village	477	91	—	316	—	—
Halfa :—						
1 Intermediate ...	278	238	88	20	—	11
2 Elementary ...	228	202	62	26	—	7
10 Village	981	677	248	225	—	18
Kassala :—						
5 Elementary ...	349	127	—	177	—	—
30 Village	1587	237	—	421	—	—
Khartoum :—						
Gordon College ...	436	265	1	—	—	—
TeachersTrng. Sch.	36	22	—	1	—	—
Technical School	149	17	—	—	—	—
3 Intermediate	476	313	2	12	—	1
9 Elementary ...	795	393	—	16	—	—
Mission School ...	211	64	—	—	—	—
Unity High School	37	4	—	—	—	—
Kordofan :—						
1 Intermediate ...	64	12	2	24	—	—
12 Elementary ...	1028	270	203	490	—	2
32 Village	1057	200	40	390	—	1
Mongalla :—						
2 Intermediate ...	205	8	—	35	—	1
Port Sudan :—						
1 Intermediate ...	96	6	1	1	—	—
5 Elementary ...	677	21	3	7	—	—
4 Village	155	30	10	9	—	—
Upper Nile :—						
1 Elementary ...	114	54	—	64	—	1
6 Mission Schools	276	37	—	34	—	—
White Nile :—						
9 Elementary ...	752	235	61	237	—	—
16 Village	433	128	59	207	—	—

(11) CHILD WELFARE AND ANTE-NATAL CLINICS

In the past this work has been carried out in the women's departments of all hospitals, but as a matter of convenience and to afford better facilities special clinics have been opened in the larger towns.

There are now seven clinics of which six were opened during the year. They are situated at the School of Midwifery Omdurman, Burri village (Khartoum), the Deims (Khartoum), Khartoum North, Atbara, Wad Medani and Port Sudan.

The Matron or a British sister attends, and any requiring further examination or treatment are sent to hospital.

There were 2,428 attendances during the year in the Khartoum Province clinics.

There must be few sections of the community in any part of the world as suspicious, shy, prejudiced, and independant as the women of the northern Sudan, and it is encouraging that their confidence has been gained to such an extent that they are prepared to seek assistance, and accept advice on these matters.

The trained midwives from the Midwifery School work in conjunction with the centres. All cases of labour among the natives of the three towns are attended by trained licensed midwives, and women with histories of abnormal labours, or regarding whom the midwife is not satisfied are referred at once to one of the Ante-Natal Clinics. In addition as many normal cases as possible are seen and examined at the clinics. It is hoped to reach the same standard of efficiency in other towns as sufficient midwives are trained to replace the old untrained "Dayas," and considerable progress in this respect has already been made.

(12) QUARANTINE

(a) PORT SUDAN QUARANTINE.

Quarantine restrictions were in force against the port of Bombay on account of cholera throughout the year. Restrictions against the port of Alexandria, on account of smallpox were withdrawn in July.

The following table shows the number of ships entering the port during the last six years :—

	1928	1929	1930	1931	1932	1933
Ships arriving	932	885	944	879	803	772
Sambuks	633	526	529	530	546	423
Men of War-British	12	17	20	18	7	14
Men of War-French	4	5	9	4	—	6
Men of War-Italian	4	6	3	4	—	—
Ships quarantined	12	—	—	—	—	—
Persons isolated from ships ...	2	—	2	—	—	1
Total Receipts	1,163	800	626	538	448	388

Four ships were worked in quarantine ; one troop-ship and one passenger ship because of smallpox on board ; the two others were ships carrying pilgrims.

(b) SUAKIN PILGRIM QUARANTINE.

General Remarks.

The number of pilgrims leaving for the Hedjaz via Suakin continues to fall.

Figures for the last 5 years are given below :—

	1929	1930	1931	1932	1933
Total pilgrims arriving at Jeddah	166,500	120,000	64,000	60,000	38,569
Pilgrims via Suakin	3,866	4,791	2,414	1,348	970

The pilgrimage of last year was a " hag Akbar " so that the figure for 1932 is probably higher than it would have been normally. Yom El Arafat fell on April 5th and the last pilgrim ship left Suakin on March 28th carrying 491 pilgrims.

The pilgrimage was declared clean on 18.4.1933. The distances and times taken by cars on the various roads are as follows :—

Roads.	Distance Miles.	Time hours.
Jeddah-Mecca	47	2
Jeddah-Medina	280	16
Yambo-Medina	156	8
Mecca-Mt. Arafat	14	Undertaken on foot.

Outgoing Pilgrims.

A total of 970 pilgrims left Suakin for the 1933 pilgrimage.

They were all vaccinated against smallpox and received a single inoculation against cholera.

The usual deposits were collected.

Vaccination was satisfactory.

The dates of departure and details of race and sex of outgoing pilgrims are giving below :—

STEAMER	Date of departure	SUDANESE				WEST AFRICANS				Grand Total
		Men	Women	Children	Total	Men	Women	Children	Total	
Talodi ...	18. 6.32	2	1	—	3	—	—	—	—	3
Talodi ...	18. 7.32	—	—	—	—	—	1	—	1	1
Talodi ...	15. 8.32	—	—	—	—	1	1	—	2	2
Talodi ...	15. 9.32	1	3	—	4	—	—	—	—	4
Talodi ...	10.10.32	—	1	—	1	—	—	—	—	1
Talodi ...	7.11.32	—	—	—	—	2	7	2	11	11
Talodi ...	5.12.32	—	—	—	—	2	1	—	3	3
Talodi ...	21. 1.33	2	—	—	2	3	4	—	7	9
Talodi ...	30. 1.33	6	—	—	6	4	—	—	4	10
Talodi ...	27. 2.33	21	15	—	36	25	27	9	61	97
Talodi ...	13. 3.33	87	46	—	133	97	84	23	204	337
Talodi ...	28. 3.33	183	76	4	263	101	106	21	228	491
Talodi ...	10. 4.33	1	—	—	1	—	—	—	—	1
Total ...	—	303	142	4	449	235	231	55	521	970

Returning Pilgrims.

The usual detention of five days after arrival at Suakin was carried out.

A total of 792 underwent quarantine. All these pilgrims had left via Suakin except two, one a sailor from a Sambuk which left Port Sudan in March, 1933, and the other was a slave repatriated from the Hedjaz.

The following table gives the dates of departure from Jeddah, and the race and sex of the returning pilgrims :—

STEAMER	Date of departure	SUDANESE			Total	WEST AFRICANS				Grand Total
		Men	Women	Children		Men	Women	Children	Total	
El Taif ...	10. 4.33	9	6	2	17	35	11	—	46	63
El Taif ...	23. 4.33	213	97	—	310	43	14	5	62	372
El Taif ...	8. 5.33	29	7	—	36	13	15	4	32	68
El Taif ...	5. 6.33	3	2	—	5	—	—	—	—	5
Talodi ...	12. 6.33	4	2	—	6	5	10	2	17	23
Talodi ...	10. 7.33	87	4	—	91	28	39	12	79	170
Talodi ...	7. 8.33	2	10	—	12	18	12	3	33	45
Talodi ...	18. 9.33	—	—	—	—	13	10	3	26	26
Talodi ...	2.10.33	—	—	—	—	3	1	—	4	4
Talodi ...	13.11.33	1	—	—	1	5	3	1	9	10
Talodi ...	11.12.33	—	—	—	—	2	2	2	6	6
TOTAL ...	—	348	128	2	478	165	117	32	314	792

Returning Pilgrims.

YEAR.	SUDANESE.			WEST AFRICANS.			TOTAL.
	Men.	Women.	Child.	Men.	Women.	Child.	
1928 ...	— 19	+ 40	— 5	— 278	— 154	— 17	— 433
1929 ...	+ 28	+ 12	+ 5	— 70	— 96	— 63	— 184
1930 ...	— 87	— 126	— 5	— 124	— 235	— 125	— 702
1931 ...	— 75	— 13	— 1	— 111	+ 84	— 4	— 120
1932 ...	— 24	— 19	— 1	+ 77	— 7	+ 29	+ 55
1933 ...	+ 45	— 14	— 2	— 70	— 114	— 23	— 178
BALANCE...	— 132	— 120	— 9	— 576	— 522	— 203	—1562

During the last six years a total of 1,562 pilgrims, of which 261 are Sudanese and 1,301 West Africans, have failed to return to the Sudan.

Pilgrims Leaving by Massowah and Returning by Suakin.

There were none in 1933.

Health of Pilgrims in the Pilgrim Camp at Suakin.

The general health of the pilgrims was good.

There were six admissions to Hospital and two deaths occurred.

The following table shows the admissions by diseases for the last 5 years :—

DISEASE.	1929	1930	1931	1932	1933
Anaemia	—	2	1	—	—
Chicken-Pox	—	3	—	1	1
Confinements	3	3	—	—	—
Disease of the Alimentary System ...	6	8	—	—	2 †
,, ,, ,, Circulatory System ...	1	—	—	—	1*
,, ,, ,, Genito-Urinary System ...	3	—	—	—	—
,, ,, ,, Nervous system	2	—	—	—	—
,, ,, ,, Respiratory system ...	3	1	2	—	—
Debility and old age	—	—	—	2	—
Dysentery, Amoebic	1	8	2	—	—
,, Bacillary	1	—	—	1	1
Malaria	2	7	2	—	1
Pneumonia	2	6	2	2	—
Scabies	—	2	1	—	—
Syphilis	—	1	—	—	—
Typhoid Fever	1	—	—	—	—
Wounds and Injuries	4	6	—	—	—
	29	47	10	6	6
Deaths	6	9	4	—	2

† Appendix abcess and Pyelophlebitis ... ... Died.

*Cardiac failure ... ... Died.

Quarantine Dues.

The total payments by a pilgrim at Suakin are as in previous years.

Payment of Quarantine Dues by West Africans.

YEAR.	Full dues paid.	Half dues paid.	No dues paid.	Total.
1929	1839	216	258	2313
1930	2252	220	399	2871
1931	1176	117	63	1356
1932	785	43	100	928
1933	327	14	48	389

Total Quarantine Dues Paid.

	£E.
In 1929 was	1,692
,, 1930 was	1,707
,, 1931 was	1,028
,, 1932 was	682
,, 1933 was	318

Improvements to the Quarantine Camp.

All the shelters have now been boarded in.

Wooden shelters now replace the tents for the use of the Ghaffirs in the sections.

(c) WADI HALFA QUARANTINE.

1,484 Egyptian labourers passed through the quarantine during 1933.

21 of these were repatriated to Egypt as unfit.

138 were found to be suffering from Bilharziasis, and were detained for treatment, on completion of which they proceeded to their destination.

(13) TRAINING.

MEN.

(a) Medical Officers.

The Kitchener School of Medicine provides a medical training on British lines. The school is in charge of a British doctor as Registrar and the various specialists stationed in Khartoum teach their particular subjects.

The course is of four years' duration and a further year is spent after qualifying, as a house surgeon at one of the large hospitals.

It has been arranged that the course will be lengthened to five years commencing with the students entering the school in 1934.

This will enable the training to be more thorough, and add considerably to the efficiency of the school.

The standard reached compares favourably with the other medical schools in the middle East.

Number of Students.

10 new students were admitted in 1933, the classes being composed as follows :—

MEDICAL STUDENTS :—	
1st Year	10
2nd Year	7
3rd Year	8
4th Year	8
SANITARY STUDENTS	2
TOTAL	35

Progress of Classes.

Examinations were held in 1st, 2nd and Final Year subjects.

1st. Year Examination Results.

Ten candidates were examined in Chemistry, Physics, and Biology. Of these 7 students reached the required standard and will continue their medical studies. 2 students failed to reach the standard required for medical students but were accepted for training as Sudanese Sanitary Officers. One student was discharged as being definitely below standard.

2nd. Year Examination Results.

Seven candidates were examined in Anatomy and Physiology. All of them passed in both subjects.

Final Examinations.

The School was fortunate in obtaining the services of Dr. H. Letheby Tidy, Physician to St. Thomas's Hospital, and Mr. A. K. Henry, Professor of Surgery, University of Egypt, as assessors in medicine and surgery respectively.

Seven candidates were examined in Medicine, Surgery, Midwifery, Gynaecology, Pathology, Public Health, Forensic Medicine, Psychiatry, and Pharmacology. One student was referred for one year on account of ill-health.

Six candidates were successful and will be posted to the larger hospitals of the Sudan as House-Surgeons and House-Physicians for one year on probation.

The successful candidates were :—

Mansour Ali Hasseb.
Abdel Hamid Bayoumi.
Habib Abdalla.
Ibrahim Abbas.
Suliman Bassioni.
Adib Abdalla.

The following student who failed in the examinations was referred for a further year :—

Bashir Mohamed Bashir.

Prizes were awarded as follows :—

Waterfield Prize in Surgery—Suliman Bassioni.
Medicine Prize—Mansour Ali Hasseb.

Sudanese Sanitary Officers.

Two Sudanese Sanitary Officers under training who were selected at the end of their 1st. year in 1932 were attached to the School for rations and quarters during 1933.

Midwifery.

The course in midwifery was extended to twice the number of lectures previously given in order to approximate more closely to the teaching in European medical schools, and to keep in touch with the steadily increasing number of cases available.

Graphic Museum.

Financial approval was obtained to draw on the capital reserve fund of the School for the purpose of building a graphic museum. (vide Kitchener School of Medicine Annual Report, 1931). The museum will be built and equipped by the end of 1934.

(b) Assistant Medical Officers.

The Assistant Medical Officers are chosen from the best of the hospital orderlies.

Special courses of instruction are given at Port Sudan Hospital, and after a year's training they undergo a written and practical examination in medical and sanitary work and those who pass are posted to dispensaries.

The training is empirical and carried out in Arabic. 15 passed out in 1933.

(c) Laboratory Assistants.

These are trained for the Sudan Medical Service at the Wellcome Tropical Research Laboratories. 4 passed in 1933.

(d) Various.

An apprentice is under training at the X-Ray Department Khartoum Hospital as assistant Radiographer.

WOMEN.

Among the most difficult medical problems to be faced in the Sudan is the supply of trained native nurses and midwives.

The Sudanese women definitely consider those professions as degrading, and it will take many years of education and propaganda to overcome this prejudice. Consequently it is difficult to get the right type of women to train, but despite these difficulties very great progress has been made during the last 10 years.

(a) Midwives.

The School of Midwifery is situated in Omdurman in charge of a British Inspectress of Midwives and a British Assistant.

These officials tour the country for three months in the year selecting suitable candidates for training whom they bring back to Omdurman. These undergo a very intensive course of six months' training in the elements of midwifery and antisepsis. At the end of this time an examination is held, and those who pass, return to work among their own people.

19 pupil midwives were trained during the year, and passed out successfully, 471 cases were attended by the pupil midwives of whom ten were actually delivered at the Midwifery Training School.

Maternity and Child-Welfare Clinic.

The number of attendances at the clinic was 1,116, and the number of new cases 626, an increase of 262.

Revision Class.

Eleven trained midwives underwent a revision course from the following Provinces :—

Khartoum	5
Blue Nile	2
Dongola	3
White Nile	1

Tours of Inspections.

The following Provinces were visited by the Inspectress or her assistant in the autumn of 1933 when 21 midwives were selected for training in 1934 :—

Blue Nile
Fung
Kordofan
Upper Nile
White Nile
Halfa
Dongola
Berber
Kassala

It may now be said that the midwifery service of the Sudan is firmly established, largely as a result of the strenuous and devoted efforts of the present Inspectress of Midwives and her assistant. Omdurman is now entirely served by trained midwives and every year shows an improvement in other districts.

It has been a long and uphill fight to overcome the prejudices and shyness of the Sudanese women who wanted neither to become midwives nor to employ them.

(b) Nursing Training School.

Selected women undergo a two years' course of training in the Omdurman women's hospital under the immediate supervision of a British Charge Sister.

Those who are successful in the final examination are posted to hospitals or female dispensaries where they have been found most successful in raising and maintaining the standard of native nursing.

During the year the number under training varied between 15 and 22.

Five pupils who completed their training and one from a Province Hospital on shorter course of training were examined in January and passed.

They were posted as follows :—

1 to Merowe.
1 to Singa.
1 to Deims (Khartoum).
1 to Burri. —„—
1 to Atbara.
1 to Port Sudan.

(14) ANNUAL MEDICAL REPORT ON SUDAN DEFENCE FORCE

for the year 1933.

The health of the Force has been satisfactorily maintained.

There has been a slight increase in the number of total admissions but the ratio of admissions to strength remains about the same.

With the exception of a small outbreak of mumps at Bara there have been no epidemics.

STRENGTH.	Total No. of Admissions.	Total No. of days sickness.	Average days sick.	
			for whole Force.	for those sick.
4,919	4,097	43,982	8.94	10.73

Assuming troops to be on duty for eleven months of the year, the total days lost through sickness is equivalent to a loss of 131.3 men and compares with previous years as follows :—

YEAR.	Strength.	Loss of man-power through sickness.	
		for whole Force.	Per 1,000 of troops.
1928	7086	160.7	22.6
1929	7024	158.7	22.5
1930	6527	173.6	26.5
1931	5333	105.6	19.8
1932	4828	122.0	25.2
1933	4919	131.3	26.7

The following table compares the sickness rates for the last nine years :—

YEAR	Average Annual Strength	Admissions	Average Constantly Sick	Ratio per 1000 of strength		Days lost through sickness	
				Admissions	Average Constantly sick	for whole force	for those sick
1925 ...	12,320	7,232	246.23	587.01	19.98	7.29	12.42
1926 ...	9,813	5,138	172.5	523.59	17.57	6.41	12.25
1927 ...	8,809	5,396	149.36	612.55	16.95	6.18	10.1
1928 ...	7,086	4,840	157.86	683.03	22.27	8.14	11.9
1929 ...	7,024	4,916	145.2	699.88	20.67	7.54	10.78
1930 ...	6,527	4,817	158.91	738.01	24.34	8.88	12.04
1931 ...	5,333	4,194	96.65	786.42	18.11	6.61	8.41
1932 ...	4,828	4,054	111.7	839.68	23.13	8.44	10.05
1933 ...	4,919	4,097	120.5	832.89	24.49	8.94	10.73

It will be noted from the above table that there has been a slight increased loss of efficiency through sickness during the year. This is accounted for mainly by a rise in the admissions for wounds and minor injuries, and malaria. Where the latter has occurred there has been a corresponding increase in cases amongst the civil population. Movement of troops on patrol has also been a contributing factor.

Admissions for all other diseases remain about the same.

Of the stations, Khartoum again shows the lowest sickness rate, Taali and Kassala the highest.

19 deaths occurred during the year. This compares with previous years as follows :—

YEAR.	No. of deaths	Mortality rate per 1,000 Troops.
1925	65	5.27
1926	48	4.89
1927	30	3.40
1928	60	8.46
1929	30	4.27
1930	44	6.74
1931	11	2.06
1932	16	3.31
1933	19	3.86

Causes of deaths were as follows :—

Tuberculosis (Pulmonary)	2
Tuberculosis (Non-Pulmonary)	1
Wounds and other injuries	3
Kala Azar (Leishmaniasis)	4
Enteric Fever...	1
Pneumonia	4
Diarrhoea	1
Mitral Regurgitation...	1
Fever of unknown origin	2

Malaria.

There were 330 more admissions for malaria this year as compared with 1932.

The bulk of this increase occurred amongst the Shendi troops on patrol in the Akobo area of the Upper Nile Province. This district is notoriously malarious and in spite of precautionary measures, fresh infections were bound to occur. Change of climate, and the extra strain and fatigue of active service conditions were also conducive to the relapse of old cases.

The increased incidence (85) amongst troops in Kordofan corresponds to an increase in that of the civilian population.

The following figures show the admission for malaria per 1,000 of the strength.

Khartoum	77
Camel Corps	298.8
Eastern Arab Corps	426.9
Western Arab Corps	117.8
Equatorial Corps	101.4

For the purpose of comparing the relative healthiness of stations as regards malaria, the above figures are of limited value.

As has been emphasized before, inhabitants of different districts vary considerably regarding their acquired or inherited immunity to malaria.

The number of officers is too small to make any deduction of any value.

As regards precaution, the usual anti-malarial measures are adopted in all stations. It is difficult to see where further progress can be made until a reliable prophylactic drug is discovered. At present no such drug exists. There are certain drugs such as quinine which exercise a greater or lesser delayed action in the onset of the disease, and so to some extent, reduce the admission rate during a limited period.

Routine quinine administration is practised in stations at the discretion of the Senior Medical Inspector.

The incidence of malaria in the Eastern Arab Corps where troops receive prophylactic quinine is a good deal higher than in the Camel Corps, where the practice has ceased. The former are, however, more susceptible and less resistant to infection.

Plasmoquine has been tried out in the Gezira. Results, on the whole, are disappointing.

The drug exercises a powerful delayed action but the difficulty is to give an effective dose without interfering with the physical activities and general well-being of the subject.

The importance of this from a military point of view is obvious.

The following table shows the admissions for malaria since 1925 :—

YEAR.	Cases.	Ratio per 1,000 of strength.
1925	1,131	91.8
1926	932	94.97
1927	948	107.7
1928	698	98.5
1929	1,165	165.86
1930	706	108.16
1931	741	138.94
1932	810	167.7
1933	1,140	231.77

Venereal Disease. As shown in the following table there has been a further slight increase in the admission rate for Arabs. That for the Equatorial Corps is less than last year.

YEAR.	ARABS.		EQUATORIAL.	
	Admissions.	Ratio per 1000 of strength.	Admissions.	Ratio per 1000 of strength.
1925 ...	1,283	125.12	110	78.68
1926 ...	878	141.08	145	100.34
1927 ...	742	115.76	39	28.55
1928 ...	611	89.48	86	69.8
1929 ...	646	114.09	80	58.73
1930 ...	685	106.91	64	46.98
1931 ...	594	135.4	49	51.81
1932 ...	570	143.0	57	67.69
1933 ...	595	145.44	52	62.8

There were 84 more cases of syphilis and soft sore, compensated for to some extent by a fall of 64 in the incidence of gonorrhoea. This increase of cases occurred chiefly in the camel Corps (45) and the Eastern Arab Corps (32).

The Senior Medical Inspector Kordofan reports as follows :—

" Venereal disease, especially gonorrhoea, has been prevalent and the cause of many admissions to hospital ; a rigorous monthly inspection has been carried out in El Obeid and cases have been found in earlier stages than previously. Wives of infected soldiers are being treated by the native nurse."

At a general inspection held in Gedaref in November the total incidence of gonorrhoea was found to be 6 per cent. At a similar inspection in 1931 5.67 per cent. were infected.

Although during the last 3 years there has been a slight rise in the incidence of venereal disease, figures compare favourably with those of troops in other countries.

The corresponding figure this year for Arab Units and Equatorials is 145.4 and 62.8 respectively.

As regards prevention it is interesting to note that where there has been a steady fall of incidence in British Troops the decline has been attributed to progress in education and social outlook and to the " home " influence of the regiment.

With native troops these factors have a limited influence. Other methods such as early treatment centres and the inspection of prostitutes have been proved a failure.

There remain three lines of attack :—

1. Regular medical inspections and the early detection of cases.

2. Lectures given by officers, combatant and non-combatant, on the dangers of venereal disease and the best means of avoiding infection.

3. Widespread anti-venereal treatment of the civil population.

Each year there is a big reduction in the incidence of venereal disease. Women are beginning to attend for treatment, propaganda is being spread by native nurses and midwives. It is in this direction that further progress can confidently be anticipated.

Bilharzia.

20 cases came under treatment as compared with 38 last year. 14 of these occurred at Khartoum and Shendi. The majority contracted the disease in the Nuba Mountains.

Pneumonia.

This disease has assumed somewhat serious proportions in the Western Arab Corps.

19 cases occurred at Fasher with 1 death, 13 at Nyala with 1 death, 7 at Geneina with 1 death.

The total represents an increase of 22 cases over that of last year and 75 per cent. of all cases of pneumonia occurring in the Force.

Guinea Worm.

This disease which has been responsible for so much disablement in the past, is happily on the decrease. The outbreak at Nyala which occurred in 1931 and persisted into 1932 has practically ceased.

Cases still occur in Mongalla Province, the worst endemic area, but it is hoped that with improved construction of wells and treatment of water the disease will be reduced to minimum proportions.

Kala Azar.

Kala Azar is endemic along the Abyssinian Border, in Darfur, and in the Kapoeta district of Mongalla Province.

The disease is probably more widespread than was hitherto supposed.

Mongalla Province. In 1931, 20 cases occurred amongst a patrol which marched from Kapoeta to Lokatiang. There were 4 deaths. In 1932, in spite of an increase among the civilian population, there were only 3 cases amongst the troops with no deaths.

This year 6 cases occurred in No. 5. Coy. who had been on manoeuvres in the infected area.

Kassala Province. 7 cases and 3 deaths are recorded from Gedaref, 3 cases and 1 death from Kassala.

Last year there were no cases. This corresponds to an increased incidence amongst the civil population in all infected districts.

A disquieting feature of the Kala Azar returns for the year is the apparent spread of infections from the southern Gedaref district where it has always been endemic, to the Kassala town district.

Darfur. In 1932 it was thought that Kala Azar was endemic in Darfur. This year it has been found to be fairly widespread. So far only one case has occurred amongst the troops.

It is not yet known for certain how this disease is transmitted, so no definite prophylactic instructions can be given against it.

A comprehensive survey is being carried out of all infected districts, and it is hoped that by the early detection and treatment of cases a lessening of the incidence will gradually occur.

(Signed) E. D. PRIDIE.

DIRECTOR,

SUDAN MEDICAL SERVICE.

ADMISSIONS TO HOSPITAL FOR N.C.Os. AND MEN DURING 1933.

STATION	Tb. Disease of lung	Other Tubercular Diseases	Syphilis	Gonorrhoea	Soft Sore	Trachoma	All other Eye Diseases	Ear	Skin	Wounds & other injuries	Non-Malignant Tumours	Bilharziasis	DysenteryAmoebic	,, Bacillary	Malaria	Kala Azar	Yaws	Dracontiasis	Tropical Ulcer	Cerebro Spinal Meningitis	Chicken Pox	Enteric (Including Para Typhoid)	Influenza	Malta Fever	Mumps	Pneumonia	Rheumatic Fever	Circulatory System	RespiratorySystem	Alimentary System	Genito-Urinary System	Nervous System	Fever of unknown origin	All other diseases	TOTAL
Khartoum	3	—	43	59	34	10	16	4	—	160	—	10	10	1	60	—	—	5	—	—	—	1	25	—	—	3	1	11	6	39	5	1	52	65	624
Shendi	1	—	6	26	1	2	29	2	—	155	—	4	9	1	262	—	—	3	—	—	—	—	—	—	—	—	—	4	19	31	3	5	4	20	587
El Obeid	1	—	4	36	14	—	5	1	2	56	—	2	6	2	88	—	—	—	—	1	5	—	—	—	—	1	—	1	26	19	15	—	—	3	288
Dilling	—	—	16	10	1	—	—	—	—	38	—	—	3	—	46	—	—	1	—	—	—	—	3	—	—	1	1	1	3	5	3	2	1	2	137
Bara	—	—	41	39	3	3	6	—	—	66	—	2	4	—	108	—	—	—	—	—	—	—	18	—	6	1	2	1	18	8	2	3	—	—	331
Kadugli	1	—	15	13	—	—	2	—	—	29	—	—	1	—	41	—	—	3	3	—	—	—	—	—	—	7	7	1	5	7	4	1	—	8	148
Kassala	1	—	30	12	—	7	—	—	4	39	—	1	4	—	131	3	—	—	—	—	—	—	1	1	—	1	—	—	27	13	—	1	—	5	281
Gedaref	1	2	16	44	1	1	15	2	9	85	—	—	8	1	202	7	—	—	—	—	—	—	3	—	—	4	—	5	15	22	6	1	5	7	462
Fasher	—	—	62	24	—	10	3	—	2	35	1	—	2	—	58	1	—	—	—	—	2	3	6	1	—	19	—	8	14	1	1	2	—	10	265
Geneina	—	—	3	20	4	—	6	—	—	25	2	—	4	—	26	—	—	2	—	—	—	—	—	1	—	7	—	1	6	8	3	—	6	1	125
Nyala	—	—	6	10	2	2	3	—	—	42	—	—	9	—	34	—	—	3	—	—	—	—	10	—	—	13	—	—	—	—	—	—	—	3	137
Torit	—	—	—	4	—	—	13	2	13	69	1	—	6	—	34	—	8	4	—	—	—	—	13	—	—	—	—	6	7	7	6	2	2	4	231
Kapoeta	—	—	1	—	—	—	9	—	1	52	—	—	6	—	19	6	—	10	—	—	—	—	1	—	—	—	—	—	1	3	—	1	—	—	110
Taali	—	—	3	12	—	1	5	1	8	118	21	—	11	—	20	—	—	9	—	—	—	—	—	—	—	3	5	—	9	2	—	—	—	—	228
Wau	—	—	—	23	—	—	2	—	—	21	—	1	4	—	2	—	—	1	—	—	1	—	10	—	1	2	—	—	1	6	—	—	—	3	78
Aweil	—	—	—	9	—	—	—	—	—	7	17	—	9	—	9	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	11	65
TOTAL	8	2	246	341	60	36	114	12	39	997	42	20	96	5	1140	17	8	41	3	1	8	4	90	3	7	62	16	39	160	171	48	19	70	142	4097

TABLE I.

Shows the admissions and deaths by disease.

DISEASE.	TOTAL.							
	Europeans.				Natives.			
	Male.		Female.		Male.		Female.	
	A.	D.	A.	D.	A.	D.	A.	D.
Table "A"								
Tubercular								
1. Disease of lung	2	1	2	—	416	66	101	11
2. All other tubercular diseases	—	—	—	—	288	24	106	10
Venereal								
3. Syphilis	3	—	1	—	5,763	14	3,734	5
4. Gonorrhoea	3	—	1	—	1,955	4	404	—
5. Soft Sore	2	—	—	—	377	—	31	—
Eye.								
6. Trachoma	2	—	1	—	469	—	186	—
7. All other eye diseases	6	—	—	—	1,663	3	911	—
8. **Ear**	3	—	—	—	192	5	86	—
9. **Skin**	4	—	—	—	893	3	286	3
10. **Wounds and other injuries**	51	—	9	—	10,771	142	2,982	48
Tumours.								
11. Malignant	—	—	—	—	114	17	69	7
12. Non-Malignant	2	—	—	—	294	5	180	2
Of Women.								
13. Gynaecological	—	—	16	1	—	—	434	11
14. Confinements	—	—	32	—	—	—	244	14
15. **Poisoning**	—	—	—	—	57	2	25	2
Total Table "A"	78	1	62	1	23,252	285	9,779	113
Table "B" (Tropical).								
1. Ancylostomiasis	—	—	—	—	253	2	103	2
2. Bilharziasis	—	—	—	—	542	3	86	1
3. Blackwater Fever	2	—	—	—	22	9	3	1
4. Dysentery, Amoebic	12	—	7	—	1680	50	590	17
5. Dysentery, Bacillary	9	—	2	—	203	5	50	1
6. Filariasis	—	—	—	—	106	3	7	—
7. Madura disease	—	—	—	—	275	2	66	2
8. Malaria	108	—	35	—	8109	85	1222	19
9. Leishmaniasis (Kala-Azar)	—	—	—	—	174	34	28	6
10. Trypanosomiasis	—	—	—	—	2	—	—	—
11. Yaws	—	—	—	—	428	1	368	—
12. Sunstroke	—	—	—	—	5	—	—	—
13. Heatstroke	1	1	—	—	34	—	11	—
14. Guinea Worm	—	—	—	—	382	1	65	—
15. Tropical Ulcer	—	—	—	—	450	3	377	—
Total Table "B"	132	1	44	—	12,665	198	2,976	49

TABLE I. (*Continued*).

Disease.	TOTAL.							
	Europeans.				Natives.			
	Male.		Female.		Male.		Female.	
	A.	D.	A.	D.	A.	D.	A.	D.
Table " C " (Infective).								
1. Anthrax	—	—	—	—	—	—	—	—
2. Beri-beri	—	—	—	—	—	—	—	—
3. Cerebrospinal–Meningitis ...	—	—	—	—	45	34	14	11
4. Chicken Pox	—	—	—	—	396	—	42	—
5. Cholera	—	—	—	—	—	—	—	—
6. Dengue	—	—	—	—	2	—	—	—
†7. Diphtheria...	7	—	2	—	21	2	21	2
8. Enteric (Including Paratyphoid)	6	1	4	—	118	17	76	7
9. Erysipelas	1	—	—	—	17	7	8	2
10. Gastro enteritis of children ...	—	—	—	—	2	—	1	—
11. Influenza	15	—	3	—	814	1	97	—
12. Leprosy	—	—	—	—	118	5	35	2
13. Malta Fever	—	—	—	—	19	1	5	1
14. Measles	—	—	—	—	101	2	22	1
15. Mumps	—	—	1	—	178	—	14	—
16. Pellagra	—	—	—	—	9	—	3	—
17. Puerperal Fever	—	—	—	—	—	—	12	2
18. Phlebotomus Fever	1	—	—	—	2	—	1	—
19. Plague	—	—	—	—	—	—	—	—
20. Pneumonia (Epidemic)	15	—	—	—	762	141	181	30
21. Rabies *	—	—	—	—	12	1	7	3
22. Relapsing Fever	—	—	—	—	—	—	—	—
23. Rheumatic Fever	2	—	—	—	279	—	70	2
24. Small Pox	—	—	—	—	54	6	12	2
25. Tetanus	—	—	—	—	14	3	7	2
26. Typhus	—	—	—	—	—	—	—	—
27. Whooping Cough	2	—	—	—	31	3	22	1
Total Table " C " ...	49	1	10	—	2,994	223	650	68
Table " D."								
1. Circulatory System	8	—	3	1	468	51	204	36
2. Respiratory System	13	—	6	—	1,891	78	444	28
3. Alimentary System	58	3	17	—	3,298	177	835	37
4. Genito-Urinary System	22	—	5	—	1,547	61	200	13
5. Nervous System	8	1	3	—	455	14	119	4
6. Scurvy	—	—	—	—	74	1	2	—
7. Diabetes	2	—	—	—	68	1	21	1
8. Fever of uncertain origin ...	6	—	—	—	605	26	97	6
9. All other diseases	7	—	8	—	4,733	28	2397	17
Total Table " D "	124	4	42	1	13,139	437	4,319	142
,, ,, " A "	78	1	62	1	23,252	285	9,779	113
,, ,, " B "	132	1	44	—	12,665	198	2,976	49
,, ,, " C "	49	1	10	—	2,994	223	650	68
Grand Total	383	7	158	2	52,050	1,143	17,724	372

† Includes Carriers

* Includes cases admitted for Anti-rabic treatment.

TABLE II.

Shows admissions and deaths in hospitals during 1933.

	EUROPEAN.			NATIVE.		
	Adm.	Died	%	Adm.	Died.	%
Bahr el Ghazal :—						
Wau	—	—	—	2,428	45	1.85
Raga	2	—	—	343	3	0.87
Tembura	—	—	—	738	4	0.54
Aweil	—	—	—	470	—	—
Li Rangu	—	—	—	1,149	7	0.60
Meridi	—	—	—	1,200	7	0.58
Rumbek	—	—	—	842	29	3.44
Province Dispensaries ..	—	—	—	981	1	0.10
Berber Province :—						
Atbara	58	2	3.45	2,125	80	3.76
Shendi	—	—	—	420	14	3.33
Province Dispensaries ..	—	—	—	630	16	2.54
Blue Nile Province :—						
Wad Medani	148	—	—	3,869	163	4.22
,, ,, Prison ...	—	—	—	560	16	2.85
Abu Usher	—	—	—	1,230	32	2.60
Sennar	5	—	—	1,888	42	2.22
Darfur Province :—						
El Fasher	—	—	—	1,734	56	3.22
Geneina	—	—	—	1,049	24	2.28
Nyala	—	—	—	773	5	0.64
Zalingei	—	—	—	1,025	6	0.58
Province Dispensaries ..	—	—	—	2,783	7	0.25
Dongola Province :—						
Merowe	—	—	—	1,191	26	2.18
Dongola	—	—	—	606	12	1.98
Fung Province :—						
Singa	2	—	—	1,147	53	4.62
Roseires	—	—	—	508	27	5.31
Kurmok	—	—	—	391	3	0.76
Province Dispensaries ..	—	—	—	87	—	—
Halfa Province :—						
Wadi Halfa	2	—	—	928	26	2.80
Kassala Province :—						
Kassala	9	—	—	2,086	58	2.76
Gedaref	—	—	—	805	80	9.93
Province Dispensaries ..	—	—	—	884	2	0.22

TABLE II—(*Continued*)

	EUROPEAN.			NATIVE.		
	Adm.	Died.	%	Adm.	Died.	%
Khartoum Province :—						
Khartoum	215	5	2.32	2,777	109	3.92
Omdurman	—	—	—	1,992	69	3.46
Khartoum North ..	—	—	—	943	16	1.69
Khartoum North Prison	1	1	100.0	265	1	0.37
River Hospital	—	—	—	1,432	7	0.48
Gebel Aulia	6	—	—	141	2	1.41
Kordofan Province :—						
Obeid	5	1	20.0	2,120	83	3.91
Nahud	—	—	—	1,102	39	3.53
Talodi	—	—	—	1,005	13	1.29
Dilling	—	—	—	1,925	9	0.46
Kadugli	—	—	—	1,338	7	0.52
Province Dispensaries ..	—	—	—	3,102	46	1.48
Mongalla Province :—						
Juba	—	—	—	2,880	41	1.42
Yei	—	—	—	384	4	1.04
Torit	—	—	—	1,101	10	0.90
Kiripi	3	—	—	805	13	1.61
Kapoeta	—	—	—	421	13	3.08
Province Dispensaries ..	—	—	—	1,338	4	0.30
Port Sudan and Suakin :—						
Port Sudan	70	—	—	2,007	58	2.88
Port Sudan Prison ..	—	—	—	115	6	5.21
Suakin	—	—	—	54	1	1.85
Suakin Quarantine ..	—	—	—	6	1	16.66
Upper Nile Province :—						
Malakal	15	—	—	3,581	72	2.01
Province Dispensaries ..	—	—	—	2,530	—	—
White Nile Province :—						
Dueim	—	—	—	847	26	3.07
Kosti	—	—	—	693	21	3.03
TOTAL	541	9	1.66	69,774	1,515	2.17

Grand Total 70,315 admissions, with 1,524 deaths.

TABLE III.

Vaccinations Performed during the year 1933.

PROVINCE.	PRIMARY.			RE-VACCINATION.			TOTAL.
	Success.	Failed.	Ukn.	Success.	Failed.	Ukn.	
Bahr El Ghazal ...	3,303	14	11,691	—	—	—	15,008
Berber ...	18,772	9,078	11,227	—	—	—	39,077
Blue Nile	32,078	9,856	19,929	2	8	—	61,873
Darfur ...	855	282	268	—	27	38	1,470
Dongola ...	13,434	3,323	746	—	—	—	17,503
Fung ...	163	60	2,117	—	—	—	2,340
Halfa ...	4,468	1,442	3,025	—	—	—	8,935
Kassala ...	23,382	5,092	8,117	9,467	2,478	5,223	53,759
Khartoum	4,124	1,265	153,938	18	—	32	159,377
Kordofan ...	12,045	3,317	2,930	1,017	383	413	20,105
Mongalla ...	1,592	168	380	—	—	—	2,140
Port Sudan & Suakin	378	50	342	1,023	460	3,855	6,108
Upper Nile	235	2	65	—	2	70	374
White Nile	11,645	2,022	13,935	1,917	297	1,518	31,334
TOTAL ...	126,474	35,971	228,710	13,444	3,655	11,149	419,403

TABLE IV.

Shews In-patients, Out-patients, Endemic Diseases and Operations during 1932 and 1933.

PROVINCE.	Hospitals	Dispensaries	In-patients.		Out-patients.		Bilharziasis.		Trachoma.		Ankylostomiasis.		Malaria.		Syphilis and Yaws.		Operations.	
			1932	1933	1932	1933	1932	1933	1932	1933	1932	1933	1932	1933	1932	1933	1932	1933
Bahr-el-Ghazal ...	5	17	6,527	8,153	226,486	364,595	28	65	71	295	52	97	1,072	690	38.597	19,115	671	1,128
Berber	2	21	3,470	3,233	441,925	544,376	763	794	18,266	27,601	109	61	14,846	24,327	2,747	2,457	591	616
Blue Nile ...	3	46	6,875	7,700	490,301	542,620	834	757	38,262	22,702	134	8	51,679	38,331	3,579	3,595	845	968
Darfur	4	15	5,081	7,364	206,112	279,959	723	1,020	4,591	3,147	—	4	2,057	1,435	16,795	17,224	466	475
Dongola	2	16	1,399	1,797	544,587	678,112	1,142	1,424	54,142	55,505	324	342	3,495	14,481	499	1,020	462	597
Fung	3	12	1,812	2,135	134,042	176,589	58	17	6,268	8,797	9	17	13,984	20,168	455	1,251	214	167
Halfa	1	7	477	930	68,790	107,672	348	1,050	6,431	14,579	29	132	1,115	2,974	91	260	80	78
Kassala	3	26	4,061	3,784	248,136	287,059	11	3	9,852	15,535	5	3	16,148	15,853	1,345	4,302	600	737
Khartoum ...	5	12	8,052	7,772	306,201	393,683	259	263	12,856	25,789	10	31	1,498	5,650	468	1,982	1,242	1,155
Kordofan	5	17	7,576	10,597	587,105	646,617	1,351	1,458	9,590	5,925	10	53	21,869	22,025	8,977	13,620	797	1,221
Mongalla	4	10	5,770	6,932	532,294	562,218	13	19	1,888	848	389	286	1,388	1,985	3,662	6,128	246	325
P. Sudan & Suakin...	1	4	2,090	2,252	92,205	93,900	199	65	3,010	3,184	5	—	476	111	176	614	438	485
Upper Nile ...	1	21	5,338	6,126	192,201	195,236	24	28	688	2,903	5	4	6,648	6,089	21,309	15,862	417	374
White Nile ...	2	10	1,114	1,540	194,027	220,363	1,489	1,573	9,564	9,087	—	—	10,746	7,777	4,265	3,818	218	283
TOTALS	41	234	59,642	70,315	4,264,412	5,092,999	7,242	8,536	175,479	195,897	1,081	1,038	146,421	161,896	102,965	91,248	7,287	8,609

TABLE V.

List showing hospitals and dispensaries during 1933.

Hospitals and Dispensaries.	Beds equipped
Bahr el Ghazal Province.	
Wau	199
Li Rangu	78
Meridi	60
Rumbek	78
Tembura	60
Aweil	17
Badagbo	—
Buma	—
Gogrial	—
Gangura	—
Ibba	—
Kashwal	—
Meshra	—
Migida	—
Ngindo	—
Nyin Akok	—
Raga	15
Said Bundas	—
Toinya	—
Tonj	—
Wun Rog	—
Yambio	—
Berber Province.	
Atbara	136
Abidia	—
Abu Hamed	6
Atbara Female Disp.	—
Atmoor	2
Berber	8
Bouga	3
Darmali	—
El Damer	—
Eneibis	6
Gadalla	2
Gandettu	—
Kabushia	—
Kitiab	2
Metemma	—
Monassir	—
Mograt Island	2
Shendi (Civil)	24
Shendi (Military)	35
Shereik	2
Timerab	—
Wad Hamed	4
Zeidab	2
Blue Nile Province.	
Wad Medani	249
Sennar	125
Abu Usher	80
Abdel Galil	—
Abdel Hakam	—
Abdel Rahman	—
Amara Kasir	—
Derwish	—
Dolga	—
Efeina	—
Futais	—
Ghubshan	—
Gondal	—
Hamad El Nil	—
Hosh	—
Hassa Heissa	—
Hag Abdalla	—
Istarihna	—
Kab El Gidad	—

Hospitals and Dispensaries.	Beds equipped
Blue Nile Province-*Ctd.*	—
Kamlin	—
Keteir	—
Komor	—
Laota	—
Managil	—
Mealig	—
Medina	—
Meringan	—
Messalemia	—
Nidiana	—
Rufaa	—
Rufaa Trav. Disp.	—
Radma	—
Remeitab	—
Sabi Deleib	
Seleima	—
Shabarga	—
Tabat	—
Tebub	—
Tayiba	—
Turabi	—
Um Degarsi	—
Wad El Ataia	—
Wad El Bur	—
Wad Hussein	—
Wad Medani Prison	33
Wad Naaman	—
Wad Rawa	—
Wad Saadalla	—
Wad Sulfab	—
Darfur Province.	
El Fasher	128
Geneina....	60
Nyala	60
Abu Matarig	—
Buram	—
Dar Gimir	—
Dereisa	—
Gorgor	—
Id El Ghanam	—
Kas	—
Kebkebia	1
Kubbum	5
Kuttum	2
Mellit	—
Meidob	—
Taweisha	—
Um Buru	19
Um Keddada	6
Zalingei	60
Dongola Province.	
Merowe	65
Dongola	62
Argo	—
Badein	—
Binna	—
Debba	—
El Seir	—
Ghaba	—
Gureir	—
Haffir	—
Kareima	—
Khandak	—
Korti	—
Kuddi	—
Kulgeili	—
Lebab	—
Mansurkotti	—
Nuri	—

Hospitals and Dispensaries.	Beds equipped
Fung Province.	
Singa	70
Roseires	60
Kurmok	32
Wisko	8
Abu Hashim	—
Abu Tiga	—
Attib	—
Chaali	—
Dar Agil	—
El Sukki	—
Gezzan and Fazogli	—
Gule	—
Karkoj	5
Kurmuk Trav. Disp.	—
Lokandi	—
Halfa Province.	
Wadi Halfa	48
Abri	—
Akasha	—
Delgo	—
Dobeira	—
Doushat	—
Fareig	—
Sawarda	—
Kassala Province.	
Kassala	142
Gedaref (Civil)	60
Gedaref (Military)	26
Gebeit	13
Tokar	18
Abu Deleig	2
Akik	—
Aroma	2
Car Dispensary	—
Derudeib	4
Doka	2
Gallabat	8
Goz Regab	2
Goz Ragab Trv. D.	—
Galaat el Nahl	3
Hawata	2
Hadaliya	—
Kassala Station	2
Khashm El Girba	2
Khashm El Girba T.D.	—
Kassab	—
Khatmia	—
Mekali	—
Metatib	—
Musmar....	—
Mefaza	—
Shawak	2
Sinkat	—
Tendelai	—
Khartoum Province.	
Khartoum	150
Khartoum North	35
,, ,, Prison	31
Omdurman	121
River Hospital	152
Gebel Aulia	72
Burri	—
Deims	—
Geili	1
Gereif	—
Gordon's Tree	—
Kheleila	—
Murada	—
Omdurman Tech. School	—
Seleitat	3
Tuti	—
Wad Nubawi	—

TABLE V, *Ctd.*

List showing hospitals and dispensaries during 1933.

Hospitals and Dispensaries	Beds equipped	Hospitals and Dispensaries	Beds equipped	Hospitals and Dispensaries	Beds equipped
Kordofan Province.		**Mongalla Province.**—*Ctd.*		**Upper Nile Province**—*Ctd.*	
		Kapoeta	48		
El Obeid	110	Kiripi	47	Kongor	8
Nahud	81	Amadi	—	Lul Mission	—
Kadugli	82	Idali	14	Melut	4
Dilling	51	Ikotos	19	Nasser	5
Talodi	60	Lyria	10	Renk	9
Um Ruwaba	30	Mongalla	2	Rom	—
Abu Zabad	22	Opari	—	S.S. Atbara	22
Abyei	—	Pini River	—	S.S. Kerreri	3
Bara	22	Taali	20	Shambe	40
Delami	6	Terrakekka	10	Tonga	3
El Odaya	10			Yirrol	17
El Liri	25	**Port Sudan and Suakin.**		Yoynyang Mission	6
Ghabeish	2	Port Sudan	89		
Lagawa	—	Port Sudan Prison	13	**White Nile Province.**	
Muglad	15	Suakin	10	El Dueim	44
Rahad	—	Suakin Quarantine	30	Kosti	44
Rashad	7	Port Sudan East Side	—	Aba Island	—
Sug El Gamal	9			Dar El Ahamda T.D.	—
Soderi	3	**Upper Nile Province.**		Fashishoya	—
Sherkeila	—	Malakal	250	Gebelein	—
Teir El Akhdar	—	Abwong	9	Geteina	—
	7	Akobo	9	Kawa	—
		Bor	22	Shawal	—
		Detwok	6	Shigeig	—
Mongalla Province.		Doleib Hill	—	Tendelti	—
		Fungak	8	Turaa	—
Juba	140	Gambeila	6		
Yei	40	Kaka	8		
Torit	56	Kodok	13	Total Beds Equipped	4400

SUDAN MEDICAL SERVICE STAFF.

1933.

Appointment.	Establishment.
Medical Staff.	
Director	1
Assistant Director and Medical Officer of Health, Khartoum	1
Senior Physician	1
Senior Surgeon	1
Ophthalmic Surgeon	1
Senior Medical Inspectors	14
Medical Inspectors	21
Senior Medical Officers	1
Syrian Medical Officers	24
Sudanese Medical Officers	34
Assistant Medical Officers	200
Dispensers	2
Radiographers	1
Assistant Radiographers	2
Laboratory Assistants	4
Midwifery Staff.	
Inspectress of Midwives	1
Matron, Midwifery Training School	1
Nursing Staff.	
Matron	1
Charge Sisters	4
Nursing Sisters	10
Sanitary Staff.	
Chief Sanitary Inspector	1
Senior Sanitary Inspectors	10
Sanitary Inspectors	5
Sudanese Sanitary Inspectors	3
Sudanese Sanitary Overseers	8
Clerical Staff.	
Superintendent	1
British Clerks	1
Sudanese Clerks	56
Sudanese Clerk-Storekeepers	3
Accountants.	
Chief Accountant	1
Sudanese Accountants	9
Medical Stores Staff.	
Chief Medical Storekeeper	1
Assistant Medical Storekeepers	2
Storemen (Sudanese)	8
Tailors	1
Carpenters	1

CHANGES IN PERSONNEL.

The following changes in personnel occurred during 1933.

Medical Inspectors.

Mr. O. F. H. Atkey (Director)	Retired to Pension	24. 8.33
Mr. C. G. Hill (Senior Surgeon)	,,	21. 6.33
Dr. E. A. H. Grylls	Resigned	7. 6.33
Mr. D. Ellis	,,	12. 3.33
Mr. F. L. Wheaton	Appointed	24. 4.33
Mr. J. F. E. Bloss	,,	5. 6.33
Mr. W. H. Greany	,,	3. 9.33
Mr. A. Royland Hunt	,,	3. 9.33
Mr. R. Kirk	,,	3. 9.33
Mr. G. C. Cochrane	,,	3. 9.33
Captain E. H. Hall	Reverted to British Army	9. 3.33

Nursing Sisters.

Miss M. C. Nicholson	Resigned	14. 1.33
Miss G. B. Favre	,,	26. 7.33
Miss M. A. Condon	,,	6. 8.33
Miss L. E. C. Lawlor	,,	12.10.33
Miss C. M. Doherty	Invalided	7. 3.33
Miss L. G. Pridham	Appointed	15. 1.33
Miss M. G. Calder	,,	14. 3.33
Miss I. Blacklock	,,	29. 4.33
Miss P. L. Castle	,,	3. 9.33
Miss H. Pembridge	,,	3. 9.33
Miss A. G. Schaffter	,,	11. 9.33
Miss C. E. White	,,	29.10.33

Medical Officers (Non-Sudanese).

5 Were retrenched.

Medical Officers (Sudanese).

9 were appointed.

Dr. Abdel Halim Mohammed	Appointed	1. 1.33
Dr. Mohammed Zaki Mustafa	,,	1. 1.33
Dr. Abdalla Omer Abu Shamma	,,	1. 1.33
Dr. Mohammed Hassan	,,	1. 1.33
Dr. Mohammed Ahmed Ali	,,	1. 1.33
Dr. Abdel Aziz Mohd. Ahmed	,,	1. 1.33
Dr. Ahmed Bokhari	,,	1. 1.33
Dr. El Hadi Fadail Allah	,,	1. 1.33
Dr. Beshir Abdel Rahim	,,	1. 1.33

Assistant Medical Officers.

1 Retired to pension.
2 Retrenched.
2 Discharged.
1 Died.
8 Appointed.

NOMINAL ROLL OF BRITISH MEDICAL STAFF

SUDAN MEDICAL SERVICE.

ON 31.12.1933.

Director	Mr. E. D. Pridie, D.S.O., O.B.E., M.B., B..S.
Asst. Dir. & M.O.H., Khtm.	Mr. H. A. Crouch, O.B.E., M.C., M.R.C.S, L.R.C.P., D.P.H.
Senior Physician	Dr. R. M. Humphreys, D.M., B.Ch., 4 N.
Senior Surgeon	Mr. F. S. Mayne, M.B., F.R.C.S.E.
Senior Medical Inspector ...	Lt.-Col. G. K. Maurice, D.S.O., M.C., M.R.C.S., L.R.C.P.
,, ,, ,, ...	Mr. A. Cruickshank, M.B., B. Ch.
,, ,, ,, ...	Mr. A. E. Lorenzen, M.R.C.S., L.R.C.P.
,, ,, ,, ...	Mr. C. E. G. Beveridge, M.R.C.S., L.R.C.P.
,, ,, ,, ...	Mr. F. E. Anderson, M.B., B.Ch.
,, ,, ,, ...	Mr. F. H. Goss, M.C., M.B., B.Ch.
,, ,, ,, ...	Mr. N. Macleod, M.B., Ch.B.
,, ,, ,, ...	Dr. L. H. Henderson, M.D., Ch.B., D.T.M., & H.
,, ,, ,, ...	Mr. J. S. Hovell, M.B., F.R.C.S.E.
,, ,, ,, ...	Mr. D. R. Macdonald, M.B., Ch.B.
,, ,, ,, ...	Mr. E. P. Pratt, M.B., B.S.
,, ,, ,, ...	Mr. J. W. Wallace, M.B. B.Ch.
,, ,, ,, ...	Mr. G. D. Rankin, M.B., B.Ch.
Medical Inspector	Mr. H. M. Elliott, B.Ch.
,, ,, ...	Mr. A. R. McKelvie, M.B., Ch.B.
,, ,, ...	Mr. J. Bryant, M.B., Ch.B., M.R.C.P.E., D.T.M. & H.
,, ,, ...	Mr. C. B. Drew, M.R.C.S., L.R.C.P.
,, ,, ...	Mr. J. S. Aldridge, M.R.C.S., L.R.C.P.
,, ,, ...	Mr. E. W. T. Morris, M.R.C.S., L.R.C.P.
,, ,, ...	Mr. H. M. Woodman, M.B., B.Ch.
,, ,, ...	Mr. A. P. Farmer, M.B., B.S., D.T.M. & H.
,, ,, ...	Mr. N. L. Corkill, M.M., M.B., Ch.B.
,, ,, ...	Mr. G. J. Clarke, M.R.C.S., L.R.C.P., D.T.M. & H.,
,, ,, ...	Mr. L. Brown, M.R.C.S., L.R.C.P.
,, ,, ...	Mr. R. McN. Buchanan, M.B., Ch.B., D.T.M. & H.
,, ,, ...	Mr. H. Richards, M.B., B.S., D.T.M. & H.
,, ,, ...	Mr. E. K. Malone, M.B., B.Ch., B.A.O.
,, ,, ...	Mr. J. L. D. Roy, M.B., Ch.B.
,, ,, ...	Mr. F. Bartholomew, M.R.C.S., L.R.C.P.
,, ,, ...	Mr. R. W. Stephenson, M.R.C.S., L.R.C.P.
,, ,, ...	Mr. F. L. Wheaton, M.B., B.S.
,, ,, ...	Mr. J. F. E. Bloss, M.R.C.S., L.R.C.P., D.T.M. & H.
,, ,, ...	Mr. W. H. Greany, M.B., B.Ch.
,, ,, ...	Mr. A. Royland Hunt, L.R.C.P., L.R.C.S. (Ed.).
,, ,, ...	Mr. G. C. Cochrane, M.R.C.S., L.R.C.P.
,, ,, ...	Mr. R. Kirk, M.B., Ch.B., F.R.F.P.S.G., D.P.H.

Senior Medical Officer ...	Captain S. M. Burrows, M.R.C.S., L.R.C.P.

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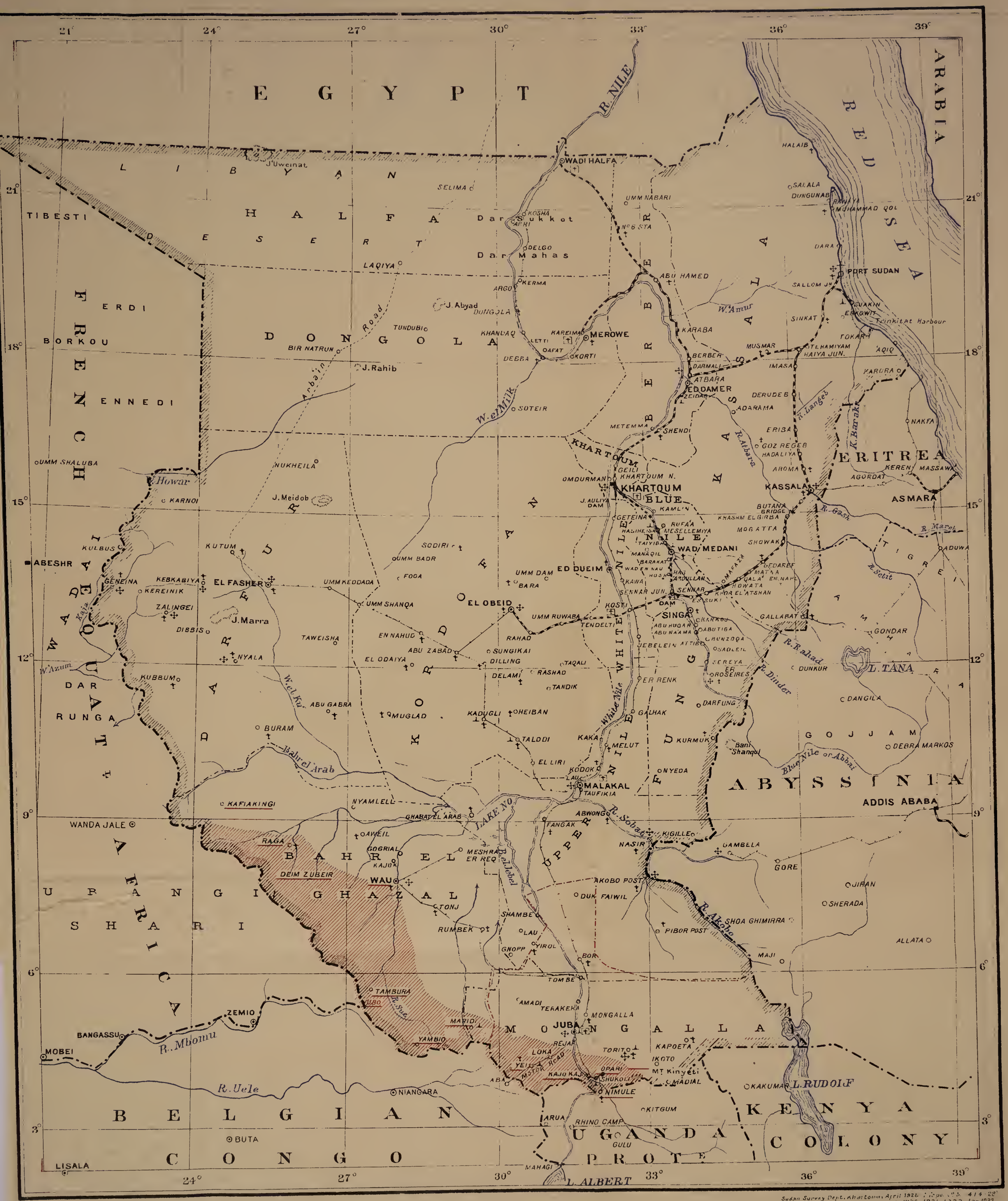
THE ANGLO EGYPTIAN SUDAN



Sudan Survey Dept. Khartoum, April 1926 ; Topo. No. 414-28'
Corrected March 1929, 1930, 1931, 1932, Jan. 1933

Scale 1:8,000,000

Miles 100 50 0 100 200 300 400 Miles

Reference.

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